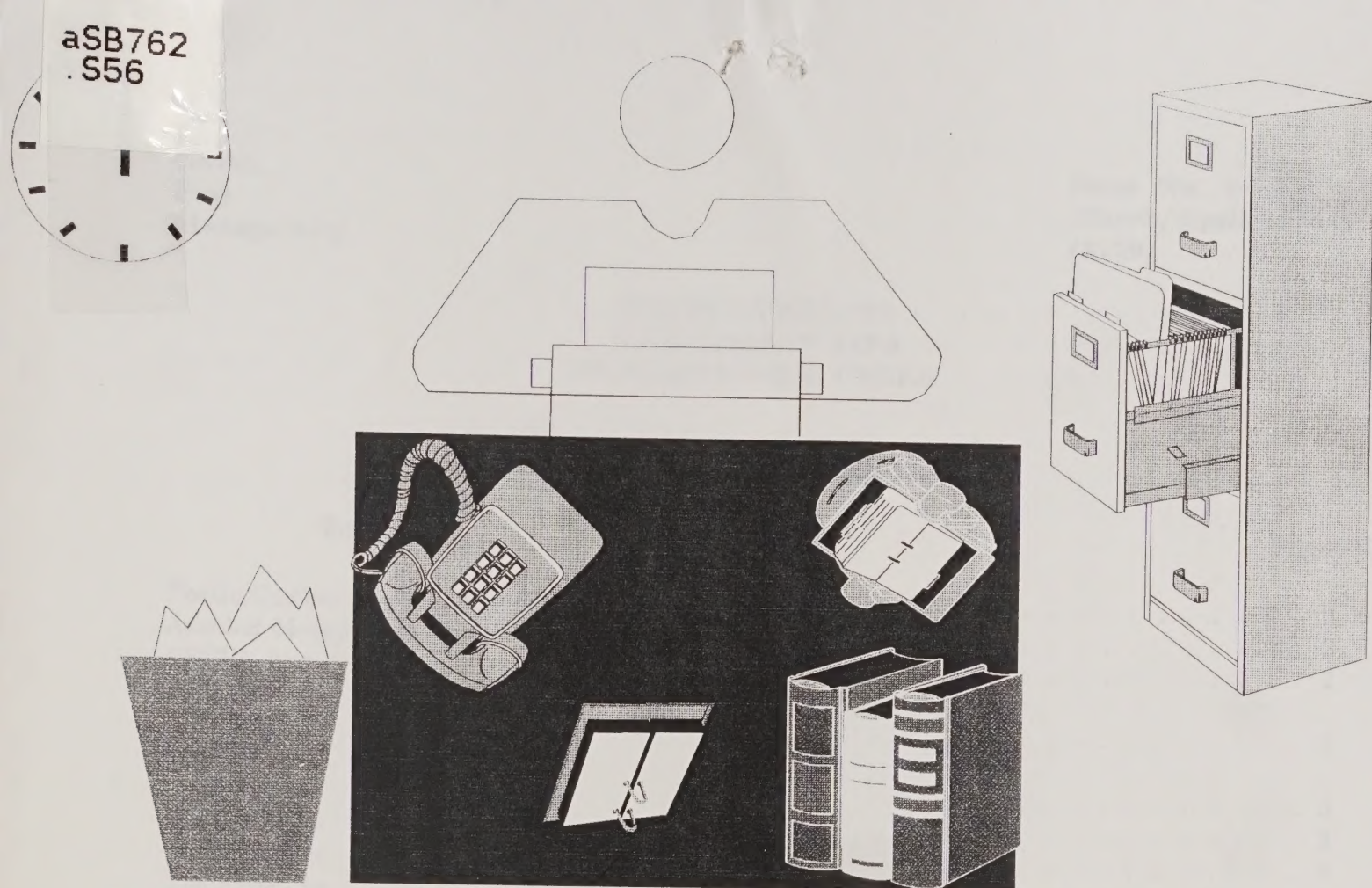


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SHORT SUBJECTS AND TIMELY TIPS FOR PESTICIDE USERS 1994

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SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
Poetic Cowboy Leaves Pesticide Coordinator's Ranks	2
Another Marana Success	2
USEPA Announces Proposal Regarding d-Limonene	2
EPA Receives Requests for Voluntary Cancellation of Products Containing Oxydemeton-Methyl	3
EPA Announces Proposed Standards for Pesticide Containers and Containment	3
Malathion Reregistration	3
Boon Expected in Biopesticide Market	4
The Sweet Smell of Betrayal	4
Tree Rings Reveal Pace and Type of Ground- Water Pollution	5
Pesticide Capsules Protect Workers, Environment	5
New Book <i>Environmental Modeling Vol. II</i>	6
Training Courses	6-7
Dod Aerial Application of Pesticides Course	6
Advanced Forest Herbicides Course	6
Integrated Forest Pest Management Course	7
Update on the Fungicide Alamo	7
Symposium - Biorational Pest Control Agents: Formulation and Delivery	7-8
What Does FSCBG Model Have To Do With JP-8 Fuel?	9
NAPIAP Newsletter from the Washington DC Front	9-10
Call for Articles	10
Publications and Reports	11

POETIC COWBOY LEAVES PESTICIDE COORDINATOR'S RANKS

As the Voluntary Separation Incentive Program picks up steam, we hear of more colleagues who have decided to leave federal civil service. It is therefore with sadness that we inform you that Garth Baxter, Pesticide Coordinator for Region 4, will be retiring on April 29, 1994. Garth is well known for sharing some of the comical range poetry that he loves at Forest Service meetings. He is also a dedicated employee who made a considerable contribution to the national pesticide program by spearheading the development of a multi-regional risk assessment for herbicide use in the Forest Service. We wish Garth and his family the best in their future endeavors.

CONTACT: JESUS COTA (DC)

(202) 205-1600

ANOTHER MARANA SUCCESS

The 4th national pesticide management course was completed March 30 at the National Advanced Resources Technology Center (NARTC). The course was presented in modules - Insecticides, Incident Command System, Common Subjects, and Herbicides. Over 50 students attended the course including three from Mexico, one from Canada and two from Russia. Special events included a half-day ecosystem field trip coordinated by Ed Monnig and international talks by Eileen Harvey (Canada), Elena Kulikova (Russia), and Shep Zedaker (Virginia Polytechnic). Course success is attributed to module leaders Julie Weatherby, Ed Monnig, Jim Brown and Jim Hadfield; to their instructors; and to the outstanding NARTC support. The steering committee plans to meet in early November to critique this course and to discuss future training.

CONTACT: JACK BARRY (CA)

(916)551-1715

USEPA ANNOUNCES PROPOSAL REGARDING d-LIMONENE

USEPA announced (Federal Register Vol. 29, No. 36, February 23, 1994) a proposal to exempt d-Limonene from the requirement of a tolerance when it is used as an inert ingredient in pesticide formulations applied to growing crops or raw agricultural commodities after harvest. This is especially interesting to the Forest Service since d-Limonene is used as an adjuvant in several herbicide and insecticide formulations we commonly use. The Federal Register notice defines eight reasons for the decision to propose this exemption, all of which reflect the safety of d-Limonene.

CONTACT: JOHN TAYLOR (GA)

(404)347-2961

EPA RECEIVES REQUESTS FOR VOLUNTARY CANCELLATION OF PRODUCTS CONTAINING OXYDEMETON-METHYL

EPA announced receipt of requests from Miles, Inc. and all remaining registrants to voluntarily cancel the registrations for products containing oxydemeton-methyl. Unless requests are withdrawn, EPA is likely to publish a cancellation order in the Federal Register on or about June 9, 1994. ODM is marketed as Metasystox-R, and has historically been used in some seed orchard pest management programs. The Notice of Intent was published in the Federal Register, Vol. 59, No. 48, Friday, March 11, 1994.

CONTACT: JOHN TAYLOR (GA)

(404)347-2961

EPA ANNOUNCES PROPOSED STANDARDS FOR PESTICIDE CONTAINERS AND CONTAINMENT

EPA has announced (Federal Register dated February 11, 1994-Vol. 59, No. 29, pp. 6712-6789) proposed standards for pesticide containers and containment. The definitions of some actions will be changed if this proposal is adopted; specifically the definitions of "triple rinsing", "liquid bulk container", and "liquid minibulk container". Personnel engaged in training pesticide applicators should watch for implementation of this proposal and be sure that when it is in place, our teaching reflects the new or modified definitions in the Standards.

CONTACT: JOHN TAYLOR (GA)

(404)347-2961

MALATHION REREGISTRATION

According to the NAPIAP Reregistration Notification Network (Vol. 4, No. 2) some commercial field uses for this pesticide will be cancelled due to the cost of reregistration. The following uses are supported and will be retained: Ornamentals (Flowers, Turf and Woody Plants, Pastureland, Pines (Seed Orchards), Pines (Slash ornamental uses). The use of malathion on forest trees is unsupported and expected to be cancelled. Most of the supported uses will be labeled on products containing the 57% emulsible concentrate (EC) formulation. Existing stocks in the hands of retailers and users may be used as labeled until such stock are exhausted.

For additional information, contact: Ms. P. Leanne Pruett, Malathion Task Force & Cheminova, Inc., (201)305-6600, FAX (201)305-1382.

CONTACT: JESUS A. COTA (DC)

(202)205-1600

BOON EXPECTED IN BIOPESTICIDE MARKET

From: *Agricultural Engineering/March 1994.*

"Synthetic chemical products are being removed from the market every day, and registration requirements are forcing many companies to abandon marginal products. At the same time, though, the U.S. government is giving preferential treatment for the development and approval of new biochemical and microbial pesticides. While seeking greater authority to ban suspect hard pesticides from the market, the EPA is accelerating the registration process for biopesticides. According to Business Communications, Inc., the market for biopesticides is expected to grow at an average annual rate of 6 percent through 2002. Total sales of biopesticides in 1992 were \$559 million; estimated sales for 2002 are \$1,002 million. (*Ag Retailer*, November 1993)."

CONTACT: JACK BARRY (CA)

(916)551-1715

THE SWEET SMELL OF BETRAYAL

From: *Agricultural Engineering/March 1994.*

"A troublesome, prickly weed, the Canada thistle, gives off chemical aromas that will arouse a usually 'sleepy' fungus - *Puccinia punctiformis* - to destroy the thistles. Seeds and roots of this weed emit the volatile chemicals that betray it. The fungus produces spores that infect the thistle and kill it. Under normal conditions, the spores are often dormant and germinate slowly. But, in lab tests, the volatiles increased the fungus spore germination up to 75 percent, making the fungus more effective and strengthening its potential as a nonchemical way to control the weed. Canada thistle, found across the northern half of the United States, is considered one of the most serious weeds infesting cropland. A biocontrol is needed because the weed is resistant to most herbicides, plus chemical controls that are effective are too costly."

For more information:

CONTACT: RICHARD C. FRENCH (MD)

(301)619-7312

TREE RINGS REVEAL PACE AND TYPE OF GROUND-WATER POLLUTION

From: *Agricultural Engineering/March 1994.*

"First, foresters used the pencil-thin cores to determine tree vigor and help plan the best time to harvest a forest. Then archeologists discovered that tree rings were windows into the past that could help them determine the age of ancient structures and wooden relics. Now scientists have found that the annual growth rings in old trees near hazardous waste dumps can reveal a picture of ground-water pollution. Through laboratory analysis of core samples, the U.S. Geological Survey has been able to determine what chemicals are flowing from a site, the date and pace of the spread, and even where toxic waste burials are located. (*Arbor Day*, January/February 1994)."

CONTACT: JACK BARRY (CA)

(916)551-1715

PESTICIDE CAPSULES PROTECT WORKERS, ENVIRONMENT

From: *Agricultural Engineering/March 1994.*

"Encapsulating pesticides in a nontoxic coating generates many benefits such as protecting workers who apply the pesticides, protecting the environment, protecting pesticides from deterioration, and reducing the amount of pesticide needed, since it all reaches its intended target. A joint effort between USDA's ARS and the Biotechnology Research and Development Corp. (BRDC) has a key goal to fine-tune the use of corn starch as an encapsulation agent for both crop and livestock pest-control applications. One of the advantages of the starch-coated product is that it adheres naturally to plant surfaces, making it more target specific and less likely to move into the soil or water when applied to a crop."

For more information:

CONTACT: J. MICHAEL GOULD (IL)

(309)688-1188

NEW BOOK
ENVIRONMENTAL MODELING VOL. II

This second volume (see publications and reports p. 11) covers groundwater pollution, long-range transport of atmospheric pollutants, Four-Dimensional-Data-Assimilation, environmental expert systems, mesoscale meteorological modeling, rainfall-runoff, application of pesticides, and other relevant topics.

The book is an organized collection of 10 chapters authored by international scientists in the field and provides the reader with a clear and consistent discussion of the mathematical, numerical, physical, chemical, biological and ecological aspects of environmental phenomena. In addition the book provides a critical review of available software for environmental simulations.

Milt Teske, Jack Barry, and Harold Thistle authored the chapter "Aerial Spray Drift Modeling." For additional information:

CONTACT: JACK BARRY (CA)

(916)551-1715

TRAINING COURSES

DoD AERIAL APPLICATION OF PESTICIDES COURSE

The annual DoD Aerial Application of Pesticides course will be held at Youngstown-Warren Regional Airt Air Reserve Station (YARS), Vienna, Ohio, June 13-17, 1994. Course topics will include aerial application fundamentals, weather, legal constraints, contractor operations, mission planning and execution, map preparation, aerial spray math, calibration, computer modeling, environmental concerns, spray monitoring, and presentations on DoD and other civilian aerial spray capabilities and equipment. The Forest Service is invited to send students.

CONTACT: TERRY BIERY (OH)
DOUG BURKETT (OH)

(216)392-1178
(216)392-1178

ADVANCED FOREST HERBICIDES COURSE

The Third Annual Advanced Forest Herbicides Course is scheduled for September 24 to October 2, 1994, in Sault Ste Marie, Ontario, Canada. This course is an intensive, practical program developed specifically for aerial and ground herbicide applicators, foresters, pesticide regulators, and those with an interest in improving their knowledge of the use of forest herbicides. Course participants will be instructed in current techniques and principles for planning, implementing and evaluating vegetation management programs. This course has been approved for 67 Society of American (SAF) Continuing Forestry Education contact hours in Category 1. For more information:

CONTACT: CRAIG HOWARD (ONTARIO, CANADA)
LISA BUSE (ONTARIO, CANADA)

(705)949-9461
(705)946-2981

INTEGRATED FOREST PEST MANAGEMENT COURSE

The First Annual Integrated Forest Pest Management Course (Insects, Diseases and Competing Vegetation) is scheduled for October 14 to October 23, 1994, in Sault Ste Marie, Ontario, Canada. This course advances the skills and knowledge of forestry professionals in current techniques and principles for planning, implementing and evaluating Integrated Forest Pest Management (IFPM) programs, not simply as control programs, but in reference to the broader scope of Integrated Resource Management (IRM). In this context "pest" will refer to insects as well as diseases and competing vegetation. This course has been approved for 67 Society of American (SAF) Continuing Forestry Education contact hours in Category 1. For more information:

CONTACT: EILEEN HARVEY (ONTARIO, CANADA)

(705)949-9461

UPDATE ON THE FUNGICIDE ALAMO

The fungicide Alamo® (propiconazole) was originally registered in 1990 in Texas under a Special Local Need (24-C) label for control of oak wilt, a vascular disease of oaks. The manufacturer, Ciba-Geigy, has reformulated the product to make it more water-soluble, safer to use, and has obtained national registration for "prevention and treatment of (1) oak wilt (*Ceratocystis fagacearum*) of live oak, Northern red oak, and Northern pin oak trees and (2) Dutch elm disease (*Ceratocystis ulmi*) of American elm trees." The fungicide is injected under pressure into root flares at the base of individual trees.

CONTACT: DALE A. STARKEY (LA)

(318) 473-7293

SYMPOSIUM

BIORATIONAL PEST CONTROL AGENTS: FORMULATION AND DELIVERY

This two-day symposium was sponsored by the American Chemical Society (ACS) and held at their annual meeting in San Diego, March 16-17. Frank Hall (Ohio State University) and Jack Barry (Forest Service) organized the symposium that focused on formulation and delivery. The following papers were presented at the symposium and will be published in a hard cover book as part of the ACS book series:

Ecological Factors Critical to the Exploitation of Biorational Pest Control Agents. J.R. Fuxa.

Bt Formulation Development and Optimization. B. Devisetty.

Registration of Biologicals: How Product Formulations Impact Data Requirements. M.L. Mendelsohn, T.C. Ellwanger, R.I. Rose, J.L. Kough, P.O. Hutton (Note Bill Schneider presented paper.)

Radiation Protection and Activity Enhancement of Viruses. M. Shapiro.

Use of Insect Pheromones in Managing Forest Insects. P.J. Shea.

Semiochemical Formulations for Insect Control in Agriculture and Forestry. J. Gillespie, S. Herbig, R. Beyerinck.

Formulation and Delivery of Entomopathogenic Fungi. D.W. Miller.

Field Evaluations of Novel Delivery Systems for Recombinant Baculovirus Pesticides. H.A. Wood.

Metarhizium Anisopliae for Soil Pests. M.R. Schwarz.

Formulation and Delivery of Biocontrol Agents for Use Against Soilborne Plant Pathogens. R.D. Lumsden, J.A. Lewis, D.R. Fravel.

Factors Affecting Spray Deposition, Distribution and Coverage of Biorational Control Agents in Forest Canopies. A. Sundaram.

Environmental Fate and Accountancy. M.E. Teske, J.W. Barry, H.W. Thistle.

Impact of Biological Agents on Non-Target Species. R. Mickle, W.R. Schneider.

Impact of Bacillus thuringiensis on Non-target Species in Forest Ecosystems. R.C. Reardon.

Starch Encapsulation of Entomopathogenic Bacteria. M.R. McGuire, B.S. Shasha.

Photostability and Rainfastness of Tebufenozide Deposits on Fir Foliage After Application of Two Formulations. K.M.S. Sundaram.

Modeling the Dose Acquisition Process of Bt. F.R. Hall, A.C. Chappel, R.A.J. Taylor.

Utilization Criteria for Mycoherbicides. G.J. Weideman, C.D. Boyette, G.E. Templeton.

Formulation and Delivery of Entomopathogenic Nematode-Based Products. R. Georgis.

For author addresses and telephone numbers:

CONTACT: JACK BARRY (CA)

(916)551-1715

WHAT DOES FSCBG MODEL HAVE TO DO WITH JP-8 FUEL?

Continuum Dynamics, Inc., Princeton, NJ, has been awarded a Phase II SBIR (Small Business Innovative Research) contract from the U.S. Air Force for the development of a microcomputer (pc-based) model for the assessment of fuel jettisoning. This two-year \$ 0.5 M contract includes an extensive research segment involving fuel evaporation studies at Rutgers University, New Brunswick, NJ, and drop size distribution determination in an outdoor wind tunnel at FAA Tech Center, Atlantic City, NJ. Until recently, the U.S. Air Force used the more volatile fuel JP-4, but is now switching over (for ground safety storage reasons) to the less volatile JP-8. Concern has been raised about the potential groundfall from this fuel (the U.S. Air Force routinely jettisons fuel for a variety of reasons, mostly involving safety, as does the U.S. Navy before aircraft landings). In the Phase I study Continuum Dynamics, Inc. applied the USDA Forest Service aerial dispersal model FSCBG to a design problem containing the parameters of interest to the U.S. Air Force. The principal modification to the existing FSCBG technology is the replacement of the water-based evaporation model with a multi-component rapid-mixing model more representative of the fuel being released from the aircraft. This work demonstrates a significant transfer of technology from one segment of the U.S. government (the USDA Forest Service) to another (the U.S. Air Force).

CONTACT: MILT TESKE (NJ)
PAT SKYLER (CA)

(609)734-9286
(916)551-1715

NAPIAP NEWSLETTER FROM THE WASHINGTON DC FRONT

The selections for FY94 Forest Service NAPIAP research projects have been completed. Altogether, there were nineteen very excellent proposals submitted. A selection committee of various Forest Service and other USDA research specialists reviewed the submissions, prioritized them and selected as many (10) as funding allowed. If you are interested in these projects, please contact the investigators directly from the following listing:

1. "Genetic Potential for Development of Resistance to *Bacillus thuringiensis* in Gypsy Moth" (NA-32) by Melody Keena and Normand DuBois, Northeastern Forest Experiment Station, Hamden, Connecticut: FY94 - \$18,000; two years.
2. "Alternative Methyl Bromide Technology" (NA-34) by DeLanson Crist, Department of Chemistry, Georgetown University, Washington DC: FY94 - \$31,000; two years.
3. "Eradication of the Oak Wilt Fungus from Logs by Fumigation with Sufuryl Fluoride (Vikane)" (NA-35) by Elmer Schmidt, Department of Forest Products University of Minnesota, St. Paul, Minnesota: FY94 - \$36,000; one year.

4. "Functional Response by Aquatic Microbial Communities to *Bacillus thuringiensis*" (NA-37) by David Behmer, Lake Superior State University, Sault St. Marie, Michigan; David Kreutzweiser and Larry Gringorten both from Natural Resources Canada, Forest Pest Management Institute, Sault St. Marie, Ontario: FY94 - \$26,000; one year.
5. "Ecological Restoration by Herbicide Retreatment of an Exotic Weed" (INT-22) by Peter Rice, Division of Biological Sciences, University of Montana, Missoula, Montana: FY94 - \$30,000; two years.
6. "Development of 2,4-D Resistant Siberian Elm to Reduce the Negative Impact of 2,4-D Drift" (NC-27) by Zong-Meng Cheng, Department of Horticulture and Forestry, North Dakota State University, Fargo, North Dakota: FY94 - \$16,000; two years.
7. "Refinement of Dazomet Application for Effective Control of Root Rot in Barefoot Forest Nurseries" (NC-28) by Jennifer Juzwik, North Central Forest Experiment Station, St. Paul, Minnesota and Raymond Allmaras, Department of Soil Science, University of Minnesota, St. Paul, Minnesota: FY94 - \$56,000; three years.
8. "Possible Genotoxic Interactions of 2,4-D; Inert Ingredients, Adjuvants and other Pesticides" (NC-29) by Vincent Garry, University of Minnesota, Minneapolis, Minnesota: FY94 - \$84,000; two years.
9. "The Biofungicide **Rotstop** May Prevent Infection of Conifer Stumps by *Heterobasidion annosum*" (PNW-50) by Catherine Parks, Forestry and Range Sciences Laboratory, La Grande, Oregon: FY94 - \$10,000; one year.
10. "Impacts of *Bacillus thuringiensis* (Bt) Sprays on Nontarget Lepidoptera on Warm Springs Indian Reservation and Population Surveys of Lepidoptera in Potential Spray Areas" (PNW-53) by David Grimbale, Pacific Northwest Research Station, Corvallis, Oregon: FY94 - \$40,000; two years.

CONTACT: JESUS COTA (DC)

(202)205-1600

CALL FOR ARTICLES

Please forward to me by the 10th of next month articles, meeting announcements, publications and reports, or other items of interest that you would like included in the next issue of "Short Subjects and Timely Tips". Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary or abstract that doesn't exceed one page in length. Please include the name, State, and telephone number of the individual who can be contacted for further information.

CONTACT: PAT SKYLER (CA)

(916)551-1715
 FAX (916)757-8383
 DG: P.SKYLER:R05H

PUBLICATIONS AND REPORTS

Ducharme, K.M., D.R. Miller, L.L. Gibbs, and W. Ni. 1994. Using LIDAR to track spray cloud drift. University of Connecticut, Department of Natural Resources Management and Engineering, Storrs, CT.

Members, National Steering Committee for Management of Gypsy Moth and Eastern Defoliators. 1994. Tactical plan - National Steering Committee for Management of Gypsy Moth and Eastern Defoliators. FPM 94-5. USDA Forest Service, Forest Pest Management, Davis, CA.

Members, National Steering Committee for Management of Seed, Cone, and Regeneration Insects. 1994. Tactical plan - National Steering Committee for Management of Seed, Cone, and Regeneration Insects. FPM 94-6. USDA Forest Service, Forest Pest Management, Davis, CA.

Richardson, B. and J. Ray. 1994. Herbicides use and regulation in New Zealand's plantation forests. NZ Forest Research Institute, Rotorua, New Zealand.

Teske, M.E., J.W. Barry and H.W. Thistle, Jr. 1994. Aerial spray drift modeling. In *Environmental Modeling Vol. II: Computer Methods and Software for Simulating Environmental Pollution and its Adverse Effects*, ed. P. Zannetti, 11-42. Southampton: Computational Mechanics Publications.

Yang, X., D.R. Miller, and J.J. Witcosky. 1994. Characterization of hardwood forest canopies in the eastern United States. University of Connecticut, Department of Natural Resources Management and Engineering, Storrs, CT.

(Please send your references for posting in "Short Subjects and Timely Tips.")

CONTACT: PAT SKYLER (CA)

(916)551-1715

The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, CA 95616 or by DG to P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
Report of the Work Group on Tree Crops Drift Mitigation	2
Worker Protection Standards	3
Application Technology Seminar	3
Interim NAPIAP Coordinator - Larry Miller	4
DOD Aerial Application of Pesticides Course	4
Advanced Forest Herbicides Course	5
Integrated Forest Pest Management Course	5
Considerations When Using Ethephon for Suppressing Dwarf and Leafy Mistletoe Infestations in Ornamental Landscapes	6
Special Meeting on Worker Protection Standards (WPS)	6/7
Pesticide Congress in July	7
Natural Fungus Stops Weeds	7
Atrazine-Munching Microbes Found	8
National Agricultural Pesticide Management Conference	8
Call for Articles	8/9
Publications and Reports	9/10

REPORT OF THE WORK GROUP ON TREE CROPS DRIFT MITIGATION

EXECUTIVE SUMMARY

U.S. tree crops represent high pest risk, high economic value crops with high pesticide drift potentials. In addition to spraying upwards into tree canopies of varying geometries, it is also clear trees are fixed (no rotation) plantings, are high in elevation relative to atomization points, and contain variable capture efficiencies. These horticultural crop ecosystems also contain a wide diversity of pests, are increasingly surrounded by urban dwellings, and are frequently family farms with a *diversity* of crops making up their farm business. In short, spray drift occurs in these situations, but there is no well defined set of strategies available to growers to mitigate the movement of pesticides out of the target area.

A 2 day workshop was held in Washington, D.C., September 14 & 15, 1993, with experts from U.S. universities, USDA, the equipment and chemical industries, and representatives of U.S. EPA, SCS, and growers from an array of U.S. horticultural tree crops. The workshop was designed to (1) identify spray drift mitigation options, (2) assess potential improvements in application practices, and (3) identify future research needs. The specific workshop goals were to identify practical options for spray drift risk mitigation in 3 different time periods: (a) short-term [1-3 years], (b) mid-term [3-5 years], and long-term [up to 10 years].

The work group discussed the benefits of education at the user level, the potential of new equipment to optimize the delivery to tree crops, the complexities of environmental and economic concerns, the chemical issues, including label changes, and the conflicts associated with IPM, drift reduction goals, farm size, and the problems associated with "match" of equipment to tree size. The recommendations outlined a series of prioritized strategies designed to mitigate drift in each of the time periods as documented in Table 1 of the final report. Short-term strategies focused on education, edge practice modifications and a pro-action pilot program to enhance grower mitigation actions. Mid-term recommendations included the development of sensors, buffer zones, and tank/tower sprayers. Long-term strategies suggested included a more flexible droplet spectra, windbreaks, overhead delivery, helicopters, and increased development of dwarfing rootstocks (to reduce tree size problems). A report is to be sent to all participants with follow-up discussions on the development of practical pro-action options with leadership from U.S. EPA, USDA, and the industry.

For more information and a copy of the report:

CONTACT: FRANK HALL (OH)

(216) 263-3726

WORKER PROTECTION STANDARDS

As most of you know, major provisions of EPA's Worker Protection Standards become effective in the middle of April, 1994 for agriculture workers and pesticide handlers. These standards apply when pesticides are applied on farms, nurseries, seed orchards, greenhouses, forests, and other sites producing agricultural commodities. These standards require several specialized warning and information signs at central information points as well as at the site of application. Gempler's, a mail order establishment in Wisconsin, has a good inventory of signs and other materials specifically designed to comply with the WPS. In addition, Gempler's has reprinted EPA's manual entitled "The Worker Protection Standard for Agricultural Pesticides-How to Comply" and has included a catalogue of supplies as an appendix to this manual. EPA's "How to Comply" manual is an indispensable resource to understand all elements of these provisions. Gempler's may be reached at (608) 437-4883 or (800) 382-8473.

CONTACT: ED MONNIG (MT)

(406) 329-3134

APPLICATION TECHNOLOGY SEMINAR

Forest Pest Management (WO/FPM/Davis) and Entotech, Inc. hosted a one-day seminar at Davis, California. Attending were Steve Nicholson (NOVO Ontario), Dr. Imre S. Otvos (Canadian Forest Service, Victoria), Dr. Kees van Frankenhuyzen (Canadian Forest Service, Sault Ste. Marie), Dr. Lorraine Maclauchian (BC Ministry of Forests, Kamloops), Temple Bowen (Entotech), Gary Kirfman (Entotech), Dr. Patrick Shea (PSW, Davis) and Prof. Norm Akesson (UCD). Discussions focused on *Bacillus thuringiensis* for management of defoliators, pheromones for bark beetles, publications and reports, Missoula Technology Development Center FPM Program and partnerships. Pat Skyler demonstrated the FSCBG/AGDISP model and Norm Akesson provided a tour of the UCD wind tunnel spray testing facility. All participants expressed need for increased communications among our respective FPM staffs and for ease of travel across the US/Canadian border.

CONTACT: JACK BARRY (CA)
STEVE NICHOLSON (ONTARIO, CANADA)

(916) 551-1715
(613) 374-1070

INTERIM NAPIAP COORDINATOR - LARRY MILLER

Due to Dr. Zedenka Horokova's retirement and the hiring freeze implemented by the Federal government, the Forest Pest Management staff has not been able to process the NATIONAL AGRICULTURAL PESTICIDE IMPACT ASSESSMENT PROGRAM (NAPIAP) grant proposals.

Larry Miller has been detailed into Dr. Horokova's position for 10 weeks starting February 1. Larry is to assist in the final disbursement of research grants to Forest Service and University research personnel. The purpose of the grants is the conduct of research to fill in data gaps in the knowledge base about several pesticides. The increase in these data bases will allow re-registration (with the EPA) of the pesticides. Larry will conduct the final review of the research proposals including coordination with other agency personnel and recommend the final award priority of those grants. Larry has tentatively set March 16 as the completion date for the review and grant process.

For fiscal year 1994 there are 17 proposals requesting a total of \$691,960. There is \$347,000 available for disbursement to the new proposals and \$375,000 allocated to continuing multi-year projects for a total of \$722,000.

Larry comes from the Rangeland Management and Ecology staff of Region 3. He has a background of 26 years with the Forest Service serving in positions related to range management, recreation management, land management planning, and business administration.

CONTACT: LARRY MILLER (DC)	(202) 205-1600
JESUS COTA (DC)	(202) 205-1600

DOD AERIAL APPLICATION OF PESTICIDES COURSE

The annual DOD Aerial Application of Pesticides course will be held at Youngstown-Warren Regional Aprt Air Reserve Station (YARS), Vienna, Ohio, June 13-17. Course topics will include aerial application fundamentals, weather, legal constraints, contractor operations, mission planning and execution, map preparation, aerial spray math, calibration, computer modeling, environmental concerns, spray monitoring, and presentations on DOD and other civilian aerial spray capabilities and equipment.

CONTACT: TERRY BIERY (OH)	(216) 392-1178
DOUG BURKETT (OH)	(216) 392-1178

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For more information:

CONTACT: CRAIG HOWARD (ONTARIO, CANADA)	(705) 949-9461
LISA BUSE (ONTARIO, CANADA)	(705) 946-2981

INTEGRATED FOREST PEST MANAGEMENT COURSE

The First Annual Integrated Forest Pest Management Course (Insects, Diseases and Competing Vegetation) is scheduled for October 14 to October 23 in Sault Ste Marie, Ontario, Canada. This course advances the skills and knowledge of forestry professionals in current techniques and principles for planning, implementing and evaluating Integrated Forest Pest Management (IFPM) programs, not simply as control programs, but in reference to the broader scope of Integrated Resource Management (IRM). In this context "pest" will refer to insects as well as diseases and competing vegetation. This course has been approved for 67 Society of American (SAF) Continuing Forestry Education contact hours in Category 1.

For more information:

CONTACT: EILLEN HARVEY (ONTARIO, CANADA)	(705) 949-9461
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CONSIDERATIONS WHEN USING ETHEPHON FOR SUPPRESSING DWARF AND LEAFY MISTLETOE INFESTATIONS IN ORNAMENTAL LANDSCAPES

By David H. Adams, Susan J. Frankel, and John M. Lichter.

From *Journal of Arboriculture* 19(6): November, 1993.

"Abstract. Ethephon [(2-chloroethyl) phosphonic acid] is registered for use in controlling dwarf and leafy mistletoe infestations in ornamental trees. Practical use of ethephon (as Florel® at label rate) is limited to suppression of dwarf and leafy mistletoe spread. Ethephon at label rates causes abscission of aerial dwarf mistletoe shoots and partial abscission of leafy mistletoe shoots, but in either application the treated mistletoe plants are not killed. Resprouting of mistletoe infections will occur and retreatment will be needed to continue suppression of mistletoe fruiting. Whole tree spraying is not recommended due to the potential environmental and economic damage that may occur from spray drifting onto sensitive nontargets and excessive chemical use. Due to the lack of significant benefit of whole tree or direct cluster spraying of leafy mistletoe with ethephon at label rate, its use for this purpose is not recommended."

CONTACT: SUSAN FRANKEL (CA)

(415) 705-2651

SPECIAL MEETING ON WORKER PROTECTION STANDARD (WPS)

On February 4, Jesus Cota and Dave Thomas attended a special meeting held by the U.S. Environmental Protection Agency (EPA) to discuss issues and concerns about the provisions in the WPS. Several State, industry, and commodity organizations have strongly expressed their doubts about successful implementation of the standard, particularly with regards to compliance and enforcement. The National Association of State Departments of Agriculture has formally requested that implementation of the WPS be delayed until 1995.

The meeting was by invitation only and included NASDA, OSHA, National Agricultural Chemicals Association, the Farm Bureau, National Association of Chemical Producers and Distributors and trade, and commodity groups. EPA opened discussion on the following principal issues: (1) Grace period for Training, (2) Retraining requirement, (3) Notification of applications, (4) Compliance with the WPS, (5) Restricted Entry Interval, (6) Personal Protective Equipment, (7) WPS vs. IPM, and (8) WPS labels. EPA has decided to seek public comment for revision of the rule on issues 1 and 2 but would not commit to opening the rule for revision on the other issues. EPA's

SPECIAL MEETING ON WORKER PROTECTION STANDARD (WPS) (Cond)

approach is to work differences out through enforcement and compliance processes before undertaking a formal revision of the rule. The Forest Service expressed a number of concerns including the application of the rule on forestry sites with mixed ownerships, REIs for biologicals and pheromones, and compliance requirements.

EPA will hold a follow-up special meeting on the WPS on February 25 so stay tuned for more information on this program.

CONTACT: JESUS COTA (DC)

(202) 205-1600

PESTICIDE CONGRESS IN JULY

The Eighth International Congress of Pesticide Chemistry will take place July 4-9 at the Sheraton-Washington Hotel in Washington, D.C. The Congress provides a forum for international scientists to discuss recent advances in pesticide chemistry, biotechnology, and related topics. One goal of the Eighth Congress is to improve public understanding of the use of chemicals in crop production, and their impact on human health and the environment. The program will take the form of symposia with platform presentations and poster session. There will also be workshops on topics of current interest. Information about the Congress may be obtained from the Office of the Secretariat at (202) 872-6286.

CONTACT: JESUS COTA (DC)

(202) 205-1600

NATURAL FUNGUS STOPS WEED

From: *Conservation Impact*, January 1994.

"A natural fungus can control a weed commonly found among southern soybean, cotton, and rice. In field tests, spraying the fungi (known as *Collectotrichum truncatum*) mixed with oil droplets in water killed more than 90 per cent of the hemp sesbania weed - compared to commercial herbicide. The USDA Agricultural Research Service (ARS) is patenting use of the fungus and scientists are developing ways to mass-produce it."

CONTACT: C. DOUGLAS BOYETTE (MS)

(601) 686-5217

ATRAZINE-MUNCHING MICROBES FOUND

From: *Conservation Impact*, January, 1994.

"Microbes already found in the soil are being harnessed to eat atrazine, one of the nation's most-used pesticides, and keep it out of water supplies."

"These newly isolated atrazine-eaters are the first microbes found to thrive in high concentrations of the pesticide, and one of the first that leaves no potentially harmful by-products."

"Most agricultural soils mineralize or completely break down less than 40 percent of the pesticide after one year. Added to atrazine-rich soil samples, the microbes ate 86 percent of the atrazine in just 150 days."

"Atrazine is among four pesticides most commonly found in well water samples near farm chemical mixing and loading sites."

"The researchers' next step is to find a way to apply the microbes to farm fields and pesticide spill sites."

For more information:

CONTACT: RONALD F. TURCO (IN)	(317) 494-8077
GRAY P. CARLSON (IN)	(317) 494-1412

NATIONAL AGRICULTURAL PESTICIDE MANAGEMENT CONFERENCE

The National Agricultural Pesticide Management Conference will be held March 7-10, St. Louis, Missouri. For more information about the conference:

CONTACT: LYN KIRSCHNER (IN)	(317) 494-9555
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CALL FOR ARTICLES

Please forward to me by the 10th of next month articles, meeting announcements, publications and reports, or other items of interest that you would like included in the next issue of "Short Subjects and Timely Tips." Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary that doesn't exceed one page in length. Please include

CALL FOR ARTICLES (Cond)

the name, State, and telephone number of the individual who can be contacted for further information.

CONTACT: PAT SKYLER (CA) (916) 551-1715
FAX (916) 757-8383
DG: P.SKYLER:R05H

PUBLICATIONS AND REPORTS

Armstrong, J. A. and C. A. Cook. 1993. Aerial spray applications on Canadian forests 1945-1990. Information Report ST-X-2. Forestry Canada, Ottawa.

Frederickson, E. A. 1994. Efficiency of forest vegetation control with herbicides - A thesis submitted to Oregon State University, Corvallis, OR.

Goldsworthy, G. J. and C. H. Wheeler. 1989. *Insect Flight*. Florida: CRC Press, Inc.

Hadfield, J. S. 1993. 1993 Warm Springs Indian Reservation western spruce budworm suppression project - Project report. USDA Forest Service, Pacific Northwest Region, Forest Pest Management, Portland, OR.

Heliovaara, K. and R. Vaisanen. 1993. *Insects and Pollution*. Florida: CRC Press, Inc.
McCooeye, M. A., R. S. Crabbe, R. E. Mickle, A. Robinson, E. B. Stimson, J. A. Arnold, and D. G. Alward. 1993. Strategy for reducing drift of aerially applied pesticides. National Research Council, Canada.

Otvos, I. S. and S. Vanderveen. 1993. Environmental report and current status of *Bacillus thuringiensis* var. *kurstaki* use for control of forest and agricultural insect pests. Ministry of Forests, Province of British Columbia, Canada.

Robertson, J. L. and H. K. Preisler. 1992. *Pesticide Bioassays with Arthropods*. Florida: CRC Press, Inc.

Yang, X., D. R. Miller, and M. E. Montgomery. 1993. Vertical distributions of canopy foliage and biologically active radiation in a defoliated/refoliated hardwood forest. *Agricultural and Forest Meteorology* 67:129-146.

PUBLICATIONS AND REPORTS (Cond)

(Please send your references for posting in "Short Subjects and Timely Tips.")

CONTACT: PAT SKYLER (CA)

(916) 551-1715

The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, CA 95616 or by DG to P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
Glyphosate Forest Worker Exposure Summary	2
Contract Awarded for Gypsy Moth Human Health Risk Assessment	2
Paper Presented at NAAA	3
National IPM Symposium	3
Methyl Bromide and Year 2001	4
Marana Pesticide-Use Management Course March 16-30, 1994	4
Reduced Herbicide Use Provides Biodiversity	5
Second Triclopyr Forest Worker Exposure Study	5
Carbaryl and Pyrethroid Field Experiment Being Conducted	6
Purple Loosestrife	6
Registration Status of Verbenone and Ispenol	7
International Conference, Forest Vegetation Management	7
FSCBG Model Runs Completed for The Netherlands	8
Call for Articles	8
Publications and Reports	8-9

GLYPHOSATE FOREST WORKER EXPOSURE SUMMARY

A 1988 study of forest worker exposures to glyphosate (Roundup) during routine directed foliar spray applications typical of silvicultural site preparation and release has been reported by Paul J. Middendorf of Georgia Institute of Technology, and a summary of the report has been prepared by Jim Brown of R-8 FH. Using "standard" protective clothing, the lowest Margin Of Safety (MOS) predicted by risk assessment modeling for typical worker exposure was 600; geometric mean dose rate from the study is a MOS of 168,377. The largest dose recorded represented an MOS of 65,039. [A much lower dermal penetration rate than expected for glyphosate is indicated.] Factors which were shown to influence exposure were gloves (use and type of material) and equipment failures. The study concluded that Roundup could be used with minimum worker doses of glyphosate with controlled work practices. The following recommendations were made:

a. Spray equipment should be regularly inspected and maintained; wand sprayers are preferable to gunjets.

b. Appropriate Personal Protective Equipment (PPE) should be provided and used.

CONTACT: JIM BROWN (GA)

(404) 347-2961

CONTRACT AWARDED FOR GYPSY MOTH HUMAN HEALTH RISK ASSESSMENT

The Northeastern Area, State and Private Forestry, has awarded a contract to prepare a human health risk assessment (HHRA) to support the new national environmental impact statement (EIS) for managing the gypsy moth. The contractor is Syracuse Environmental Research Associates, Inc., (SERA) of Fayetteville, New York. SERA prepared the HHRA for the national EIS on the Medfly control program prepared by USDA Animal and Plant Health Inspection Service. The new gypsy moth HHRA will examine the health risks from contact with gypsy moth life stages and exposure to diflubenzuron, *B.t.*, gypsy moth nucleopolyhedrosis virus (Gypchek), gypsy moth pheromone (Disparlure), and DDVP (a toxicant used in large capacity male moth traps). Groups at risk will include project workers, people who live in or visit treated areas, and special groups such as children, the elderly, chemically sensitive people, and immunosuppressed individuals. A number of unique challenges will require new and innovative methods. One such challenge will be assessing the risks associated with the microbial insecticides *B.t.* and Gypchek since the existing methods lend themselves to use with the chemicals only. Other challenges include developing methods for addressing inert ingredients; adjuvants added to tank mixes; synergistic, additive and cumulative effects; and risks to special groups. Completion of the risk assessment is scheduled for early September 1994.

CONTACT: NOEL SCHNEEBERGER (PA)

(215) 975-4108

PAPER PRESENTED AT NAAA

Harold Flake, Forest Pest Management, R-8, presented a paper entitled "FSCBG spray swath width predictions" at the 27th Annual Convention and Exposition of the National Agricultural Aviation Association (NAAA) in Reno, Nevada, on December 6, 1993. The paper was given in a joint technical session with NAAA and the American Society of Agricultural Engineers.

Abstract

This paper describes how the USDA Forest Service aerial application model FSCBG can be used to estimate aircraft swath width for use on operational aerial application projects. In the paper theoretical swath widths are examined for two fixed wing aircraft (Ag-Husky, AT-502A) and two rotor wing aircraft (Bell G47, Bell 204B). Variables examined were release height, wind direction, drop size distribution, dispersion units, volatile fraction, temperature and relative humidity. FSCBG is shown to be a tool to evaluate swath width of aircraft under various simulated conditions and may eliminate many of the inherent problems associated with calibrating aircraft swath width under field conditions.

CONTACT: HAROLD FLAKE (GA)

(404) 347-2961

NATIONAL IPM SYMPOSIUM

ESCOP is sponsoring their second national IPM symposium and workshop at Las Vegas, Nevada, April 19-22, 1994. The 1994 symposium theme is IPM Programs for the 21st Century: Food Safety and Environmental Stewardship and the purpose is to provide an opportunity for interdisciplinary scientists to exchange current advances in IPM research, education, and implementation. Coordinator is Ronald J. Kuhr, Department of Entomology, Post Office Box 7613, North Carolina State University, Raleigh, North Carolina 27695-7613.

CONTACT: RONALD J. KUHR (NC)

(919) 515-2746

METHYL BROMIDE AND YEAR 2001

The U.S. Environmental Protection Agency has added methyl bromide to the Clean Air Act of Class I Ozone Depleting Substances. EPA's final rule on methyl bromide will freeze U.S. production and importation of the fumigant at 1991 levels until January 1, 2001, without requiring interim reductions. The rule took effect January 1, 1994. Although there is no single alternative treatment to this soil and space fumigant, the EPA believes alternative chemicals and growing methods can substitute in many situations.

Also, the USDA has recently published the proceedings from a workshop on alternatives to methyl bromide held in June 1993. Titled "Alternatives to Methyl Bromide: Assessment of Research Needs and Priorities." The 85-page proceedings contains crop and commodity recommendations on the alternatives to methyl bromide for postharvest treatment, quarantine treatment, and soil fumigation. Research needs and priorities are also suggested. A copy may be obtained from: Dr. Kenneth Vick, USDA-ARS-NPS, 10300 Baltimore Boulevard, Beltsville, Maryland 20705-2350.

CONTACT: KENNETH VICK (MD)
JESUS COTA (DC)

(301) 504-5321
(202) 205-1600

MARANA PESTICIDE-USE MANAGEMENT COURSE MARCH 16-30, 1994

We have had an excellent response to the course with over 60 students registered. The National Advanced Resource Technology Center (NARTC) soon will be sending out letters to students and faculty on student acceptance, lodging, and transportation in addition to the course schedule.

CONTACT: ROGER CORNER (AZ)
JACK BARRY (CA)

(602) 670-6414
(916) 551-1715

REDUCED HERBICIDE USE PROVIDES BIODIVERSITY

Sagebrush control plots were established 10-years ago at the Benmore Experimental Range on the Uinta National Forest. Recent observations of these plots show that where tebuthiuron had been applied at less than the usual amount, considerable improvement in the biodiversity of the sagebrush-grass vegetation type was achieved. Garth Baxter, R-4 Pesticide Coordinator, said lowered application rates of tebuthiuron (0.2-0.5 lbs. active ingredient per acre) reduces big sagebrush to a desired density and subsequently increase the amount and variety of grasses and forbs. Tebuthiuron which is a pelletized herbicide currently marketed as Spike 20 P, is typically applied at a much higher rate for sagebrush eradication. By thinning dense stands of sagebrush and increasing the mixture of grass and forbs, wildlife benefits and soil moisture increases. According to studies being conducted by the University of Wyoming, a number of wildlife benefits occur by thinning dense stands of sagebrush. This includes increased insect populations for young chicks and nesting hens, more perch sites for song birds, small mammal (rodent) population increases as well as more use by larger wildlife such as elk, deer, and antelope. This treatment appears to have long term ecological benefits.

CONTACT: GARTH BAXTER (UT)
DG: G.Baxter:R04A

(801) 625-5258

SECOND TRICLOPYR FOREST WORKER EXPOSURE STUDY

A 1988/1989 study of forest worker exposures to triclopyr (Garlon 4) during routine directed foliar spray applications typical of silvicultural site preparation and release has been reported by Paul J. Middendorf of Georgia Institute of Technology, and a summary of the report has been prepared by Jim Brown of R-8 FH. Using "standard" protective clothing, the lowest Margin Of Safety (MOS) predicted by risk assessment modeling for typical worker exposure was 290; geometric mean dose rates from the study is a MOS of 153. Six of the 22 workers in the study failed to meet the minimum acceptable MOS of 100; the lowest MOS reported was 18. Five of these six excessive doses can be explained by equipment leaks which saturated workers' clothing or hands and were not properly cleaned up; these offer interesting case studies of the results of improper hygiene in pesticide operations. Other factors which contributed to dose included height and density of treated vegetation, training and experience of crews, use of gloves, mixing procedures, and equipment maintenance. The following recommendations were made to minimize worker exposure:

- a. Sites should be treated before vegetation height exceeds six feet.
- b. Adequate training should be provided for all workers and crew leaders.
- c. Spray equipment should be regularly inspected and maintained.
- d. Appropriate Personal Protective Equipment (PPE) should be provided and used.
- e. Proper personal hygiene, including decontamination, should be stressed.

CONTACT: JIM BROWN (GA)

(404) 347-2961

CARBARYL AND PYRETHROID FIELD EXPERIMENT BEING CONDUCTED

The Ogden Field Office and Utah State University are working jointly on a TDP funded project titled - "Field Experiment to Test the Effectiveness of Carbaryl and Pyrethroid Insecticides to Protect Englemann Spruce from Spruce Beetle Infestation." Objective - to evaluate the efficacy of pyrethrins as a preventative treatment for spruce beetle. Description of Project - single application of two concentrations each of Sevimol, Tempo 2, and Asana XL. The experiment consists of six treatments and a control. Sevimol rates were applied at 1.0 and 2.0 percent, Tempo 2 at 0.008 and 0.025 percent, and Asana XL at 0.025 and 0.05 percent. Hydraulic sprayers mounted on conventional trailers were used to apply the insecticides. Each treatment consists of 32 trees with an additional 64 trees used as untreated controls (32 untreated checks for 1994 and 32 untreated checks for 1995). All insecticides were applied in September 1993. Spruce beetle pheromone baits will be used as attractants to challenge the treated trees. Pheromone baits will be placed in May of 1994 and again in May of 1995 to determine efficacy over a 2-year period. For further information:

CONTACT: STEVE MUNSON (UT)	(801) 476-9728
JOHN ANHOLD (UT)	(801) 476-9732

PURPLE LOOSESTRIFE

Another exotic weed on the march. Purple loosestrife (*Lythrum salicaria*) looks like fireweed and gayfeather/blazing star. It likes wetlands and is a concern in the Rocky Mountains. A color brochure on this weed is available from: City of Boulder Open Space Department, 66 South Cherryvale Road, Boulder, Colorado 80303.

CONTACT: CITY OF BOULDER	
OPEN SPACE DEPARTMENT, COLORADO	(303) 441-4142

REGISTRATION STATUS OF VERBENONE AND ISPENOL

As of January 7, 1994, the registration of Verbenone, another bark beetle pheromone, is currently being pursued by Phero Tech, Inc., located in British Columbia, Canada. Formal registration packages have not been submitted. Phero Tech received three experimental use permits in 1993 for three formulations of Verbenone so that field trials could continue so that efficacy could be quantified. The three formulations were bubble caps, beads and pouches. Phero Tech believes that full registration for the pouch formulation may be obtained in 1994, but does not have sufficient efficacy data at this time to submit registration packages for bubble caps or beads, and no date can be estimated at this time. The label for the pouch formulation will only cover the southern pine beetle. Phero Tech mentioned that the efficacy data obtained thus far for both bubble caps and beads has been quite variable and that more tests will be required.

In reviewing the strategic plans for the various insect steering committees, the need to register Ispenol has never been identified. It was suggested, however, that the Tier 1 toxicity studies should be completed. The only work that is currently being pursued is various combinations of mixtures of Verbenone and Ispenol. Phero Tech does not feel that there is a need currently to pursue registration of Ispenol by itself, but rather to obtain registration of Verbenone and Ispenol, in combination, if future research results in the desired efficacy.

CONTACT: DAVE THOMAS (DC)

(202) 205-1600

INTERNATIONAL CONFERENCE FOREST VEGETATION MANAGEMENT

Please share with your colleagues and cooperators information on this conference on stand establishment and inter-rotation management to be held at Rotorua, New Zealand, March 20-24, 1995.

"NEW ZEALAND - has a temperate to sub-tropical climate, ideal for the growth of various tree crop species. There are approximately 1.2 million hectares of *Pinus radiata* producing on average 25 m³ per hectare per annum. Intensive forest establishment has been practiced for many decades and current developments are focused on the utilization of agricultural practices, as well as the further integration of harvesting and land-preparation operations to maintain sustainability while boosting productivity."

For further information on the program and arrangements:

CONTACT: JACK BARRY (CA)
BRIAN RICHARDSON (NEW ZEALAND)

(916) 551-1715
FAX (073) 479-380

FSCBG MODEL RUNS COMPLETED FOR THE NETHERLANDS

At the request of Dr. Paul Jellema, Plant Protection Service, The Netherlands, FSCBG computer model runs were made using a Piper Pawnee Brave and Ayres Turbo Thrush inputting variable release heights and wind speeds. Dr. Jellema learned of the FSCBG aerial spray model from Dr. Harold Thistle, USDA Forest Service, during a poster presentation at the Second International Symposium on Pesticides Application Techniques in Strasbourg, France, September 1993. Dr. Jellema indicated that he was interested in deposition due to drift after aerial application and a better understanding of drift to surface water after aerial application. He also indicated that aerial application in The Netherlands is mainly performed on arable crops such as potatoes and that the crops are frequently intersected by ditches and canals. Because the distance between crop and surface water is very small (1-2 meters), toxicity towards water organisms is a major concern. The 18 model runs were made by the USDA Forest Service, Forest Pest Management staff, Davis, California.

CONTACT: PAT SKYLER (CA)

(916) 551-1715

CALL FOR ARTICLES

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CONTACT: PAT SKYLER (CA)

(916) 551-1715

FAX (916) 757-8383

DG: P.SKYLER:R05H

PUBLICATIONS AND REPORTS

J. W. Barry 1993. Supplement to sixth report - National steering committee for management of gypsy moth and eastern defoliators - USDA-APHIS pesticide evaluation reports. FPM 94-3. USDA Forest Service, Forest Pest Management, Davis, California.

J. W. Barry 1993. Sixth report - National steering committee for management of gypsy moth and eastern defoliators. FPM 93-15. USDA Forest Service, Forest Pest Management, Davis, California.

J. A. Clingenpeel 1993. Herbicide effectiveness monitoring on the Ouachita national forest for water quality in fiscal years 1989 through 1993. USDA Forest Service, Ouachita National Forest, Hot Springs National Park, Arkansas.

PUBLICATIONS AND REPORTS (Contd.)

H. W. Flake, M. E. Teske, and J. W. Barry. 1993. FSCBG spray swath width predictions. Paper No. AA93-003. Presented at *27th annual convention and exposition of the national agricultural aviation association (NAAA)*. Reno, Nevada.

B. P. Gay and D. P. Segers. 1993. Specialized laboratory support task TA-31 - Droplet evaporation - Data report. SRI-APC-93-597-6819.7. Prepared by Southern Research Institute for U.S. Army Dugway Proving Ground, Dugway, Utah.

A. Z. MacNichol and M. E. Teske. 1994. FSCBG model comparisons with the 1991 Davis virus spray trials. FPM 94-2 (C.D.I. Technical Note No. 93-14). Prepared under Contract No. 53-0343-1-00153 by Continuum Dynamics, Inc., for USDA Forest Service, Forest Pest Management, Davis, California.

D. B. Smith, M. H. Willcutt, D. L. Valcore, J. W. Barry, and M. E. Teske. 1993. Guidelines for aerial atomization and spray drift reduction for Mississippi applicators. Information Bulletin 251. Mississippi Agricultural & Forestry Experiment Station, Mississippi State, Mississippi.

The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, California 95616 or by DG to P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

**SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS**

TABLE OF CONTENTS

Topic	Page No.
Detail Opportunity - WO Forest Pest Management/PUM&C Group	1
Evaluation of DGPS Aircraft Guidance Systems for Use in Complex Terrain	2
Stump Applicator System for Feller-Bunchers	3
Symposium on Conservation Biology to be Held in Seattle	3-4
Worst Weeds in the Intermountain and Plains Areas	4-5
EPA Worker Protection	5-6
Pennsylvania State University Publications Available	6
Ag Chemicals Just a Bloom Away	6-7
California Spray Technology Workshop	7
FSCBG Model and Jet Fuel Jettisoning	7
Laundering Pesticide Contaminated Clothing	7-9
Experimental Use Permits	9-10
Ames Comments on Chemicals in our Food	10
Utah Has One Case of Pneumonic Plague (1994)	11
Hantavirus	11
Endangered Species Update	11-12
New Products	12-13
Call for Articles	13
Publications and Reports	13-15

**DETAIL OPPORTUNITY - WO FOREST PEST MANAGEMENT/
PUM&C GROUP**

Washington Office, Forest Pest Management, is announcing two detail opportunities in the Pesticide Use Management & Coordination Group. The two position titles are Assistant Director and Pesticide Specialist. Both details have a starting date of January 1995 and will last from 6 to 12 months. Salary, travel, and per diem will be covered by WO/FPM. In the meantime, Dave Thomas has been designated as Acting Assistant Director. For additional information -

CONTACT: DAVE THOMAS (DC)

(202)205-1600

EVALUATION OF DGPS AIRCRAFT GUIDANCE SYSTEMS FOR USE IN COMPLEX TERRAIN

A test of Differential Global Positioning System (DGPS) was conducted by Missoula Technology and Development Center (MTDC) on the Ninemile Ranger District between October 11 and 17, 1994. These tests were sponsored by WO-FPM with Jack Barry as the FPM sponsor/coordinator. Harold Thistle, MTDC, Project Leader, aided by Tony Jasumback and Bill Kilroy, designed and conducted the test. This technology promises aircraft positioning and guidance with an absolute accuracy of 2-5 meters. A test course was surveyed in on the Ninemile Ranger District with the help of Don Patterson (R1-Eng). This course consisted of a line which was surveyed in with 2 cm accuracy and three 'blocks' which each tested certain features of the DGPS Navigation systems.

There was substantial interest in these tests. Approximately 75 people participated as observers or in other parts of the technical program, which was designed to familiarize people with this type of equipment. Three countries (U.S., Canada and New Zealand) sent personnel to observe the test. Along with our foreign visitors, Federal and State agencies, as well as private firms and academia, sent observers. This allowed for interaction among government, industry, and academia.

The results of the tests were mixed. Two companies (AgNav, Swanton VT and SatLoc, Casa Grande AZ) agreed to participate in these tests. The companies paid their own expenses to demonstrate their respective systems which indicated a strong commitment to developing navigation systems suited to USDA-FS applications. The test course was designed to find the limits of these systems from an engineering standpoint, and as such, was a success. Unfortunately, weather conditions were marginal during both test days so the full system capabilities couldn't be examined. The test results are being analyzed and a full detailed report is forthcoming. Initial indications are that it is still worthwhile to do some independent ground proofing if these systems are to be the sole source of positional information on a project.

An informative week was enjoyed by all and thanks for logistical support is offered to Dave Rising, Mike Huey and the rest of the folks at the MTDC fabrication shop; all of the people at the AFD who helped with the aviation aspects; the MTDC photographic shop; and the Ninemile Ranger District. Jack Barry (WO/FPM) was the driving force in getting the testing off the ground. To summarize, DGPS navigation will be the wave of the future where high accuracy flying and documentation are required. It is still a new technology and mountain flying offers additional challenges to this technology not encountered in flatland applications.

CONTACT: HAROLD THISTLE (MT)

(406) 329-3981

STUMP APPLICATOR SYSTEM FOR FELLER-BUNCHERS

An initial test of an attachable stump applicator for feller-bunchers, to control annosum root rot, was conducted at the Savannah River Forest Station the week of September 19-23, 1994. Richard Karsky and others at the Missoula Technology Development Center designed and fabricated a relatively simple, practical spray system for the feller-buncher. This initial test successfully completes the first phase of a cooperative project to develop a stump applicator attachment, evaluate the performance of the applicator, and complete an economical analysis of stump treatments for control of annosum root rot. The cooperators on this project are the U.S. Department of Energy Savannah River Site, Savannah River Forest Station, Forest Health, Missoula Technology & Development Center, Clemson University, and Auburn University. In March 1995, a pilot test of the stump applicator system will occur in three longleaf pine stands scheduled for thinning at the Savannah River Site. Two stump treatments, Tim-Bor insecticide and *Phlebia gigantea* (*Peniophora gigantea*), will be applied.

CONTACT: MICHELLE CRAM (NC)

(704) 257-4316

SYMPOSIUM ON CONSERVATION BIOLOGY TO BE HELD IN SEATTLE

A symposium entitled "Role of Forest and Rangeland Vegetation Management in Conservation Biology" will be convened at the Weed Science Society of America annual meeting in Seattle, WA in 1995. Public views and perceptions about public land management by federal and state government agencies and land management by private enterprises are having a significant impact on resource management policies. Land management decisions are being closely scrutinized by a broad diversity of groups that often have conflicting views about how public and private lands should be utilized. Nowhere is the public debate more intense and potentially divisive than in the Pacific Northwest. Current controversial issues include the implementation of the Endangered Species Act, management of old-growth forests, livestock grazing on public lands, use of pesticides in rangeland and forest management schemes, and impact of management practices on plant and animal diversity and ecosystem stability and sustainability.

The goal of the Symposium is to demonstrate that vegetation management based on current science and technology can provide sustainable production of commodities from forests and rangelands that are needed by society while perpetuating and enhancing biodiversity within these ecosystems. Presentations during the full day symposium will cover a broad range of topics including overviews of rangeland and forest resources, concepts of conservation biology, strategies to manage resources at the ecosystem and landscape levels, threat of noxious weeds to biodiversity, impact of vegetation management on wildlife populations, assessment of public perceptions of land management policies, resolving conflicts between a diverse array of competing resource users, and strategies to bring competing users together to meet common land management goals. There will be ample opportunity

for lively and spirited discussion. For more information contact Robert A. Masters, USDA-ARS, Department of Agronomy, University of Nebraska, Lincoln, or Mike Newton, Oregon State University, Corvallis.

CONTACT: MIKE NEWTON (OR)

(503) 737-6076

WORST WEEDS IN THE INTERMOUNTAIN AND PLAINS AREAS

In the Intermountain and Great Plains portions of the U.S. a distinction should be made between weedy species of cultivated areas and the weeds of non-cultivated areas (rangeland and forest). Although there is some overlap there are numerous species that are problems in rangeland and forests and are less serious in intensively managed agricultural areas. These include species such as cheat grass, the knapweeds, leafy spurge, rush skeletonweed, dyer's woad, and others. These species are significant challenges to managers of dryland ecosystems that remain in a natural or semi-natural state.

The weeds of cultivated agricultural areas can often be very specific to certain crop, cultivation, and treatment regimes. Some species such as *kochia* have developed resistance to many herbicides. Others including many grass and grass-like weeds species (such as the nutsedges) are very similar to important crops such as the small grains (wheat, etc) and are very difficult to treat selectively without injuring the crop.

There are several interesting collections of papers on the issue of exotic species including noxious weeds. In a book entitled "Biological Invasions: a Global Perspective" (J.A. Drake, ed.; published in 1989 by John Wiley & Sons) is a chapter on terrestrial plant invasions which lists the 18 most serious agricultural weeds. These species are taken from a larger list of 250 weeds provided in L.G. Holms book "The World's Worst Weeds". The two nutsedges (*Cyperus sp.*) are on the list of 18. The author also draws attention to bracken fern (*Pteridium aquilinum*) which he describes as either the world's worst weed or the most successful Pteridophyte.

The book "Biological Pollution: the Control and Impact of Invasive Exotic Species" (Bill McKnight, ed.; published in 1993 by Indiana Academy of Science) details many examples of invasions of species ranging from vertebrates and invertebrates to plants and microorganisms.

Finally from a longer term perspective, I suggest an essay by Aldo Leopold entitled "Cheat Takes Over." He closes his essay with the thought: "I have listened carefully for clues whether the West has accepted cheat grass as a necessary evil, to be lived with until kingdom come, or whether it regards cheat as a challenge to rectify its past errors in land-use. I found the hopeless attitude almost universal. There is, as yet, no sense of pride in the husbandry of wild plants and animals, no sense of shame in the proprietorship of a sick landscape. We tilt windmills in behalf of conservation in convention hall and editorial offices but in the back forty we disclaim even owning a lance."

Perhaps we have made some progress in our valuation of wild and native plants and landscapes since Leopold's assessment. However, it is clear that our challenges are greater than even he imagined.

CONTACT: ED MONNIG (MT)

(406) 329-3134

EPA WORKER PROTECTION

(From *Farm Safety*, Vol. 1, No. 1, Spring 1994, Department of Biological and Agricultural Engineering, University of California, Davis, CA)

"Congress has postponed for nine months, the new EPA Worker Protection Standards (WPS). The compliance deadline for the new EPA rules for handler and field work training is now January 1, 1995. Significant among the postponements is the requirement to provide training for workers who enter fields that have been treated with pesticides. The training requirements for handlers has also been delayed, but according to Lupe Sandoval of Integrated Pest Management Education and Publication (IPM), at U C Davis, that just means that compliance with California's own regulations remains the standard until January 1995. California has for many years required, and will continue to require, annual documented training of workers who handle pesticides."

"Farmers must still comply with the existing requirements for annual documented training for pesticide handlers every five years. States may agree to have trainers issue training certificates, but this is a voluntary state program. Pesticide handlers must continue to comply with requirements concerning restricted entry intervals, personal protective equipment use, exchange of application information with commercial applicators and restrictions during application. One significant change under the WPS is the requirement that pesticide handlers be trained to recognize, treat and prevent heat stress."

"Until January 1, 1995, it is not a 'misuse' to use a pesticide in a way inconsistent with WPS provisions incorporated *by reference* on the label. This recent delay does **not** apply to rules currently existing on labels, such as restricted entry intervals (REIs) and personal protective equipment (PPE). For current irrigation practices during which the only contact with treated surfaces is to the feet, lower legs, hands, and arms the provided early-entry PPE may consist of coveralls, and chemical resistant gloves and footwear instead of the label-specified items."

"Beginning January 1, 1995, crop advisors will be covered by WPS protections. Also, employers will have to ensure that prior to entering an area where an application or restricted-entry interval has ended within the past 30 days, all workers (nonhandlers of pesticides) will have received general pesticide safety training. Employers will also need to notify workers (orally or by posting) about all pesticide applications. Sandoval also indicated that the proposed California version of WPS would require training for workers before they enter treated fields. The proposed training would be provided every 5 years and trainers will issue each worker an EPA training card recognized in other states."

"There are a variety of training materials now available and others soon to be available. New pesticide handler and worker training manuals and videos can be ordered direct from agricultural supply specialists such as Gemplers, P.O. Box 270, Mt. Horeb, WI 53572, telephone 1-800-382-8473. The training manuals will soon be distributed free of charge (in large quantities only) at sites in San Diego, Fresno, Salinas and Sacramento. For information on the distribution sites, call the CAPCA office at 916-443-2476. For additional information on these and other training programs, contact the IPM Education and Publication at the University of California at Davis, 916-752-7691."

CONTACT: Bill Steinke (CA)

(916)752-1613

PENNSYLVANIA STATE UNIVERSITY PUBLICATIONS AVAILABLE

AATL 93-1. Aircraft Tracking Guidance & Flight Path Recording in Forest Spray Projects: An Evaluation using two Differentially Corrected GPS-Based Systems.

AATL 93-2. Effect of Different Adjuvants on Aqueous Dimilin 4L Applied Aerially Under Low Humidity Conditions.

AATL 93-3. Study of Off-Site Deposition of Malathion Using Operational Procedures for the Southeastern Cotton Boll Weevil Eradication Program.

AATL 94-1. Operational Use of Differentially corrected GPS Based Aircraft Tracking Guidance & Flight Path Recording Systems in Forest Spray Projects.

AATL 94-2. Effects of Simulated Field Deposits of Foray 48B on Gypsy Moth Larvae.

For copies of these publications:

CONTACT: STEVE MACZUGA (PA)

(814) 863-4432

AG CHEMICALS JUST A BLOOM AWAY

(From *Resource - Engineering & Technology for a Sustainable World*, Sept. 1994)

"A new agricultural chemical delivery system called BLOOMSTRIP can apply fertilizers, pesticides, algicides, herbicides, fungicides and growth regulators through a 1x1/8-inch rubber strip. The product works based on a phenomenon called bloom - where one or more ingredients migrate to the surface of the rubber over time. The rubber stripping, which rests on the soil, contains the agricultural chemical as part of its formula. The chemical then blooms to the surface of the

stripping, where ambient conditions wash it into the soil. Benefits include: On-site delivery with no atmospheric dispersion, single application at any time, can deliver fertilizer and herbicide together."

For more information -

CONTACT: JAMES FARLEY (PA)

(610) 622-5653

CALIFORNIA SPRAY TECHNOLOGY WORKSHOP

California Department of Pesticide Regulation sponsored a workshop on ultra low volume (ULV) and electrostatic spray systems. These technologies, which have been under development over the past two decades, have demonstrated increased efficacy at reduced rates and volumes. The problem is that many labels do not allow reduced volumes thus the technology cannot be used. Recognizing this problem the Department sponsored the workshop to hear from growers, applicators, and researchers from industry and government. Jack Barry, WO/FPM/Davis, CA, gave an overview of USDA Forest Service Bt, ULV activities. Minutes of the meeting will be prepared and a committee selected to develop recommendations to deal with registration and label changes for electrostatic and ULV applications.

CONTACT: JACK BARRY (CA)

(916) 758-4600

FSCBG MODEL AND JET FUEL JETTISONING

Drs. T. Quackenbush and M. Teske of Continuum Dynamics, Inc. and C. Polymeropoulos, Rutgers University, published a paper "A Model for Assessing Fuel Jettisoning Effects" (see Publications and Reports this issue). The paper discusses application of the Forest Service Cramer-Barry-Grim (FSCBG) model to predict the groundfall of JP-4 and JP-8 jet fuels. Simulations with FSCBG demonstrate the need for careful assessment of the environmental impact of JP-8 jettisoning events. While the audience of these Short Subjects may have little interest in contamination from JP-8 fuel we thought it of interest to show this diverse technology transfer of FSCBG.

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(916) 758-4600

LAUNDERING PESTICIDE CONTAMINATED CLOTHING

This article is "recycled" to you via the New Jersey Department of Environmental Protection and Energy and United States Army Center for Health Promotion and Preventive Medicine, *Pest Management Bulletin* Vol. 15, No. 4, September 1994. The following are quoted extracts from Vol. 15, No. 4.

If pesticides get on your clothing, change clothes as soon as possible. Don't wait until the end of the day or until you've finished the job. If you continue to wear pesticide-contaminated clothing, the pesticide residue could be absorbed through your skin into your bloodstream, where it could cause serious health problems.

When you handle pesticide-contaminated clothing, always wear unlined waterproof gloves. Also, thoroughly clean washers after laundering contaminated clothing. This means that after every load of pesticide-contaminated clothing, run the machine through a complete cycle with hot water and detergent only. This simple step requires a little extra time, but studies show that it will help to prevent contaminating future wash loads.

Never take pesticide contaminated clothing home to be laundered in the family washing machine. Launder **ONLY** clothing contaminated with water-soluble low-toxicity pesticides. Discard contaminated leather items, such as watchbands, gloves, and boots. You cannot decontaminate leather items. When these items are worn again and become wet, the pesticide residue could become active again and could cause a rash or sores.

Never handle pesticide-contaminated clothing with your bare hands. To avoid dermal exposure, always wear unlined waterproof gloves. Wash the gloves off thoroughly before removing them and use them for this purpose only. Test gloves for leaks by filling them with water and gently squeezing. Discard gloves as soon as they develop a leak.

On a daily basis, launder clothing worn during pesticide applications. Pesticide residues in clothing can build up and become more difficult to remove.

If you must store contaminated clothing before laundering, hang them in an area not used by you or your co-workers, and where air movement will help dissipate or remove some of the pesticide.

Because pesticide residues could be transferred to other clothing in the wash load, always launder contaminated clothes separately. This will help prevent contaminating clothing worn by other workers.

Research at North Dakota State University shows that prerinsing is a very important step. It not only reduces the amount of pesticide in contaminated clothing before laundering, but it also minimizes contamination of laundry equipment, which could then contaminate clothing in future wash loads.

Empty pockets and cuffs of any pesticide granules outdoors, and discard them safely. In a bucket or pail, prerinse contaminated clothing in hot or warm water at least twice. Because pesticide formulations usually contain some detergent, it is not necessary to add detergents when prerinsing. Dispose of prerinse water as a pesticide-related waste.

Launder only a few (three or four) contaminated garments at a time. Use a full water level to thoroughly flush the pesticide from the fabric. This also decreases the possibility of redepositing pesticide residue on fabric.

Wash together only garments contaminated with the same pesticide. Hot (140 deg F) water is most effective in removing pesticide residues from clothing. Cold water is least effective.

Use a normal 12-minute wash cycle. Select detergents according to the type of pesticide that contaminated the clothing. Research has shown that heavy-duty detergents, such as Era● and Wisk●, are more effective than other detergents in removing emulsifiable concentrate pesticide formulations. Emulsifiable concentrate formulations are oil-based and heavy-duty liquid detergents are known for their oil-removing ability. Research shows that granular detergents such as Tide●, Oxydol●, and Cheer●, are effective in removing water-soluble pesticides. If it is not possible to determine the pesticide formulation, use a heavy-duty detergent.

For more effective removal of pesticide residue, repeat the wash cycle several times.

Line dry laundered garments outdoors. This eliminates the possibility of pesticide residue collecting in the dryer where it could contaminate clothes in future loads. Sunlight and air movement help to decontaminate any pesticide residue not removed during laundering.

Editor's note - Use of disposable protective clothing and devices eliminates need to launder. Also non-disposable, heavily contaminated clothing might be more safely handled through disposal. Such clothing and devices should be placed in plastic bags and disposed of as pesticide contaminated waste.

For a copy of the full article -

CONTACT: JACK BARRY (CA)

(916) 758-4600

EXPERIMENTAL USE PERMITS

(From *Utah Pesticide and Toxic News*, Vol. 12, No. 9, September 1994, Cooperative Extension Service, Utah State University)

"EPA is announcing that it is expanding the acreage cutoff for when an experimental use permit (EUP) is required under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) from 10 acres to 250 acres for certain uses of biological pesticides. These uses include arthropod pheromones, irrespective of formulation, when used in nonfood areas at a maximum use rate of 150 grams active ingredient per acre per year. Tests conducted with pheromone products on food crops entering commerce would still require an EUP and a temporary tolerance or an exemption from the requirement of a temporary tolerance. Similarly, testing on acreages exceeding 250 acres for all pheromones (food and nonfood uses) still requires an EUP. This policy became effective

July 7, 1994. For further information, contact: Phil Hutton, Product Manager, EPA, Registration Division, Office of Pesticide Programs, 401 M Street SW, Washington, DC 20460, phone (703) 305-7690. (AEN, 7/94)"

AMES COMMENTS ON CHEMICALS IN OUR FOOD

(From *Utah Pesticide and Toxic News*, Vol. 12, No. 9, September 1994, Cooperative Extension Service, Utah State University)

"Dr. Bruce Ames, an internationally renowned biochemist at the University of California, recently estimated that 99.99% of the pesticides we eat are naturally occurring - made by plants to defend themselves against diseases, insects, and other predators. Of these naturally occurring pesticides, only a small portion have been tested for carcinogenic potential. Those naturally occurring pesticides that have been shown to cause cancer in rats are present in over fifty common foods such as apples, broccoli, brussels sprouts, basil, lettuce, mangoes, mushrooms, mustard, orange juice, potatoes, parsnips, and pears. He found that some produce items contain rodent carcinogens by EPA risk standards. Dr. Ames asserted that his findings do not indicate that natural pesticides are important in causing human cancer, only that the findings cast doubt on the relative importance of low doses of synthetic chemicals in causing cancer. An example was provided stating that the average daily intake of the banned insecticide DDT has the same carcinogenic risk as drinking one can of beer (which contains natural carcinogens) every 8,000 years. Parallel to Ames' ideas, other scientists maintain that the benefits of pesticides, which help ensure widely available and affordable fruits and vegetables, justify their use. The anti-cancer benefits from such things as vitamin C and beta-carotene in fresh produce far outweigh any tiny increased cancer risk from pesticides. Ames has asserted that cancer incidence is mostly related to age. This is because each day, the DNA in each cell of our body is damaged up to 10,000 times. Our body's cells have mechanisms to repair DNA damage, but these mechanisms are imperfect. Thus, the number of unrepaired and mutated DNA increased with time, and thought to contribute to incidence of cancer and other age related illness. (PCR, 9/94)."

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UTAH HAS ONE CASE OF PNEUMONIC PLAGUE (1994)

(From *Utah Pesticide and Toxic News*, Vol. XII, No. 10, October 1994, Cooperative Extension Service, Utah State University)

"When her cat returned home after a week in the woods of Box Elder County, the 15-year-old girl cleaned its wounds and snuggled the cat each night at bedtime ignoring its harsh cough. After a week the girl developed a cough and soon became ill. The girl was sick for at least two weeks before being hospitalized on July 10. She remained in intensive care for five weeks. Though still on oxygen, she is making slow progress towards recovery. The cat died on July 17. The girl is the second confirmed case of pneumonic plague in Utah in 80 years. The only other case was a woman from San Juan County in 1984. Pneumonic plague was also found in a cat from San Juan County this summer but did not involve humans. (SVE, 9/94)"

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HANTAVIRUS

Deer mice (*Peromyscus maniculatus*) which ranges throughout the lower 48 states is the carrier of hantavirus. According to unconfirmed sources, preliminary tests suggest that 15% of the deer mice are infected with the virus.

"On June 19, 1994, a 29-year-old woman from Price died two days after being hospitalized with flu-like symptoms. The Centers for Disease Control verified a Hantavirus diagnosis. Probable exposure was rodent droppings while cleaning. Two weeks later a 67-year-old man from Tooele County was diagnosed with hantavirus, but recovered after two months of hospitalization. His exposure was a rodent nest in a garage. Of 31 deer mice trapped near his home, 33% were positive for hantavirus. A third case involved a woman in Salt Lake County who was exposed to rodent droppings while cleaning her home." (From *Utah Pesticide and Toxic News*, Vol. XII, No. 10, October 1994, Cooperative Extension Service, Utah State University)

CONTACT: JACK BARRY (CA)

(916) 758-4600

ENDANGERED SPECIES UPDATE

(From *Utah Pesticide and Toxic News*, Vol. XII, No. 10, October 1994, Cooperative Extension Service, Utah State University)

"As 1994 comes to a close, EPA's Office of Pesticide Program (OPP) is putting the finishing touches on its Endangered Species Protection Program. EPA emphasizes that the cornerstone of the program will be EPA's commitment to protecting listed species from potentially harmful

exposure to pesticides while minimizing unnecessary burdens on the pesticide-using public. The Federal Register Notice officially announcing the final program will be issued within the next several months. EPA incorporated roughly 260 comments it received on the initially proposed program into this final program. Many thoughtful recommendations contributed to what EPA believes is an effective program to protect endangered and threatened species - one that also avoids placing unnecessary requirements on responsible pesticide users."

"Shortly after the final program is announced, OPP will take the first of several steps that will initiate the transition from the current voluntary program to a mandatory, enforceable program. OPP will issue instructions to pesticide registrants to change the labels of certain pesticide products to include a statement alerting users to potential concern for endangered and threatened species and to the need to follow special, local instructions found in a County Bulletin if one exists for their county. A toll-free hotline will be available to tell users whether OPP has produced a bulletin for their county."

"In the current voluntary program involving 22 states, more than 250 county-specific Interim Pamphlets are being distributed, with hundreds more in development. New additions to the inventory include pamphlets for Alabama, Kansas, Kentucky, and South Dakota. OPP is continuing to produce Endangered Species Fact Sheets. During this past summer, EPA has been working closely with the US Fish and Wildlife Service and the US Department of Agriculture to develop strategies for communicating the requirements of the program to all affected parties and for ensuring use of the best possible distribution mechanisms for program documents. (EPA, 10/94)"

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NEW PRODUCTS

(From *Pest Management Bulletin* Vol. 15, No. 4, September 1994, Department of the Army, Aberdeen Proving Ground, MD,)

"Robin Services, Inc, 611 Raleigh Place, S.E., 1 Floor, Washington, DC 20032, has introduced 'The Next Generation in Glue Traps.' It is called Silent George and contains three sticky traps (sticky on both sides) which fit into a hard plastic holding case which has openings on all sides to allow pests in."

"Zeneca Ag Products, 1800 Concord Pike, Wilmington, DE 19897, (302) 886-1000, has introduced Prelude® Termiticide/ Insecticide (formerly Torpedo Insecticide). The active ingredient is permethrin at 25.6% and is available in 2 1/2 gallon plastic jugs and 15 and 30 gallon returnable containers. It is labeled for pre- and postconstruction treatments for a variety of wood damaging insects and other general insect pests."

"Ecopic™, 725 South Adams Road, Suite #270, Birmingham, MI 48009, (313) 647-0505, has a product called Ecopic, The Effective Bird Deterrent. This is a series of stainless steel rods placed in a clear plastic base (similar to the cat's claw design) which is designed to be placed along ledges on buildings to prevent birds from nesting."

For information on any of these products call the DoD Pesticide Hotline (410) 671-3773 or send a request to pestnews@aeha1.apgea.army.mil.

CALL FOR ARTICLES

Please forward to me by the 15th of next month all articles, meeting announcements, publications, reports, or other items of interest that you would like included in the next issue of Short Subjects and Timely Tips. Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary or abstract that doesn't exceed one page in length. Please include the name, State, and telephone number of the individual who can be contacted for further information.

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PUBLICATIONS AND REPORTS

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The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, CA 95616; E-Mail to: /s=p.skyler/ou1=r05h@mhs-fswa.attmail.com or by DG to: P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
1994 Pesticide Coordinators Meeting - Second Notice	1
Log Importation	2
Risk Assessment Conference	2
SDTF Orchard Airblast Drift Review Panel	3
USDA and EPA Sign Agreement to Reduce Pesticide Use	3
Quantities of Pesticides Most Commonly used in U.S.	
Agricultural Crop Production	4
Quantities of Pesticides Most Commonly Used in	
Non-Agricultural Sectors of U.S.	5
Pesticide Sales Statistics	5
Weed Control Video	6
What's the World's Worst Weed?	6
High Priority Sought for Minor Use Chemicals	6-7
Interagency Experience for Jesus Cota	7
Pesticides - Little Cancer Risk	7-8
Elm Leaf Beetle Control	8
Call for Articles	8
Publications and Reports	9

1994 PESTICIDE COORDINATORS MEETING - SECOND NOTICE

The 1994 Annual Pesticide Coordinators meeting will be held during the week of October 24-28, 1994, at the Fountain Suites Hotel in Sacramento, CA (916)441-1444 or 1(800)767-1777. When making reservations, mention you will be attending the "Pesticide Coordinators Meeting" to get the government rate. The hotel is close to the Sacramento airport and shuttle service is available. Region 5 is hosting the meeting and has planned a 1 day field trip to the Eldorado National Forest. A committee has been formed to organize the agenda and further details. Members include: John Borrecco, Region 5; Ed Monnig, Region 1; Jim Brown, Region 8; Dave Bakke, Eldorado National Forest, Region 5; a representative of Sierra Pacific Industries, Placerville, CA; and Dave Thomas, FPM, WO. The formal call letter will go out shortly.

CONTACT: DAVE THOMAS (DC)

(202)205-1600

LOG IMPORTATION

The final environmental impact statement (EIS) on the Importation of Logs, Lumber, and Other Unmanufactured Wood Articles was released in July 1994. The EIS was prepared by the Animal and Plant Health Inspection Service (APHIS). The preferred alternative, based on the results of pest risk assessments for the importation of logs from Siberia, Chile, and New Zealand and after receiving public comment on the advance notice of proposed rulemaking, contains technical modifications to proposed regulations (59 FR 3002-3029, January 20, 1994). In brief, the proposed regulations would impose three basic requirements for the entry of regulated articles into the U.S.:

1. A permit issued by APHIS. Conditions required in the permits may involve physical (debarking, heat treatment) and chemical treatments (with chemicals registered by the EPA) to ensure that plant pests are not inadvertently introduced into the U.S.
2. An importer document or certificate verifying that the conditions of the APHIS regulations have been met.
3. Inspection of all regulated articles at the time of arrival.

The EIS contains tables listing regulated articles, requirements for permits by article, requirements for specified articles, and universal importation requirements by article. The EIS also contains a detailed analysis of potential impact from the use of methyl bromide and potential effects on ozone depletion.

Copies of the EIS may be obtained from:

APHIS, USDA
6505 Belcrest Road
Hyattsville, MD 20782

CONTACT: JOHN KLIEJUNAS (CA)

(415)705-2571

RISK ASSESSMENT CONFERENCE

On November 1-2, 1994 the following conference "Environmental Risk Assessment: Politics and Policymaking" is being held in Arlington, VA. The conference is sponsored by the publication "Inside EPA". For registration information call (800)424-9068 (in D.C. call (703)416-8505), FAX (703)416-8543.

CONTACT: JESUS COTA (DC)

(202)205-1600

SDTF ORCHARD AIRBLAST DRIFT REVIEW PANEL

The Spray Drift Task Force (SDTF) organized a panel of experts to review drift data collected downwind of orchard airblast spray operations (June 28 - 29, Washington, D.C.). The SDTF is a consortium of over 30 agricultural chemical manufacturers who are developing mathematical models to be used in the pesticide (re-) registration process. This review was encouraged by USEPA and brought together a panel from industry, academics and the federal government. The panel was generally impressed with the amount and scope of data that were presented, primarily by Drs. Dave Johnson (Stewart Agricultural), Andrew Hewitt (Stewart Agricultural) and George Ramsey (DuPont) all of the task force. Harold Thistle, Project Leader, Missoula Technology and Development Center USDA-FS was invited to participate as a reviewer. The panel made several suggestions primarily concerned with the calibration of collection devices and with the range of ambient conditions tested. The data are confidential and proprietary as of this writing but SDTF has stated that many of the data will be presented to the scientific community at large at the American Society of Agricultural Engineers national meeting in Atlanta, GA.

CONTACT: HAROLD THISTLE

(406)329-3981

USDA AND EPA SIGN AGREEMENT TO REDUCE PESTICIDE USE

(From *Utah Pesticide and Toxic News*, Vol. 12, No. 8, August 1994, Cooperative Extension Service, Utah State University)

"U.S. Department of Agriculture Secretary Mike Espy and U.S. Environmental Protection Agency Administrator Carol M. Browner signed a Memorandum of Understanding on August 16, 1994, committing their agencies to providing the agricultural community with pest management techniques and tools that reduce pesticide risks to public health and the environment, while ensuring economically sound agricultural production. Joining Espy and Browner at the signing was Senator Patrick Leahy (D-VT), Chairman of the Senate Agriculture Committee."

"The agreement includes provisions to increase research for alternative and effective pest control management techniques and practices that will help reduce unacceptable risks to farmworkers and consumers. The agreement establishes practical avenues for transferring these pest control management tools to the nation's commodity producers. Within six months, USDA and EPA will identify those cases where producers will face a lack of pest management tools due to pending regulatory action. USDA will work with the agriculture and research communities to identify and develop alternative pest control methods. In looking for alternatives, EPA will seek pest control methods that significantly reduce risks to human health and the environment. If it is determined that the alternative pest control method requires an EPA registration, EPA will expedite review of that application."

"The agreement complements a detailed pesticide food and safety reform package presented by the Clinton Administration to Congress in the spring. The reform package is based upon a strong health-based standard. (USDA, 8/16/94)"

CONTACT: JACK BARRY (CA)

(916)551-1715

**QUANTITIES OF PESTICIDES MOST COMMONLY USED IN
U.S. AGRICULTURAL CROP PRODUCTION**
(Approximate Quantities, 1993)

(From *Utah Pesticide and Toxic News*, Vol. 12, No. 8, August 1994, Cooperative Extension Service, Utah State University)

Pesticide	Usage In Million Pounds a.i.	Pesticide	Usage in Million Pounds a.i.
Atrazine (Aatrex)-H	70-75	EPTC (Eptam)-H	10-15
Metolachlor (Dual)-H	60-65	Chlorpyrifos (Lorsban)-I	10-15
Sulfur (Thiolux)-F	45-50	Chlorothalonil (Bravo)-F	10-15
Alachlor (Lasso)-H	45-50	Propanil (Stam)-H	7-12
Methyl-bromide (Meth-O-GAS)-SF	30-35	Dicamba (Banvel)-H	6-10
Cyanazine (Bladex)-H	30-35	Terbufos (Counter)-I	5-8
Dichloropropene (Telone)SF	30-35	Bentazon (Basagran)-H	4-7
2,4-D -H	25-30	Mancozeb (Dithane)-F	4-7
Metam Sodium (Vapam)-SF	25-30	Copper Hydroxide (Kocide)-F	4-7
Trifluralin (Treflan)-H	20-25	Parathion -I	4-7
Petroleum Oil (Volck)-I	20-25	Simazine (Princep)-H	3-6
Pendimethalin (Prowl)-H	20-25	Butylate (Sutan)-H	3-6
Glyphosate (Roundup)-H	15-20		

**QUANTITIES OF PESTICIDES MOST COMMONLY USED IN
NON-AGRICULTURAL SECTORS OF U.S.**
(Approximate Quantities, 1993)

(From *Utah Pesticide and Toxic News*, Vol. 12, No. 8, August 1994, Cooperative Extension Service, Utah State University)

Pesticide	Usage In Million Pounds a.i.	Pesticide	Usage In Million Pounds a.i.
2,4-D -H	12-15	Dicamba (Banvel)-H	3-5
Chlorpyrifos (Dursban)-I	9-12	Diuron (Karmex)-H	3-5
Diazinon (D.Z.N.)-I	8-10	Naled (Dibrom)-I	3-5
Glyphosate (Roundup)-H	4-6	MCPP (Mecomec)-H	3-5
Malathion (Cythion)-I	4-6	Carbaryl (Sevin)-I	2-4

(Source: EPA estimates based on a variety of sources.)

F = Fungicide, H = Herbicide, I = Insecticide, SF = Soil Fumigant

CONTACT: HOWARD DEER (UT)

(801)797-1600

PESTICIDE SALES STATISTICS

The National Agricultural Chemicals Association recently reported that 1992 pesticide sales increased 3.9% over 1991 sales. Corn pesticides were 27.4% and soybean 14.9% sales. Herbicides represented more than 60.0%, insecticides more than 63%, and fungicides increased 7.9%. What percent of total sales is used on national forest system lands? The 1988 figure estimated by Dennis Hamel was less than one tenth of one percent.

CONTACT: JACK BARRY (CA)

(916)551-1715

WEED CONTROL VIDEO

Montana State University is offering a video that describes the biological weed control process. Biological control is the most promising method of controlling noxious weeds like knapweed and leafy spurge that are seriously impacting the ecological balance on forest and rangelands. The video is \$25.00 and available from MSU Extension Publications Office, 115 Culbertson Hall, MSU, Bozeman, MT 59717.

CONTACT: JACK BARRY (CA)

(916)551-1715

WHAT'S THE WORLD'S WORST WEED?

That depends on where you live and what you are trying to grow. There does seem to be some consensus, at least among agriculturists, that yellow nutsedge (*Cyperus esculentus*) and purple nutsedge (*Cyperus rotundus*) rank high in the worst category. To U.S. western growers nutsedge made the top ten according to an article in the January issue of "Crop Protection Management". What are the ten worse weeds challenging U.S. western forest and range managers? How are they being managed? What are your research needs? Who is doing the research on your identified weeds? Your responses will be published in the next issue.

CONTACT: JACK BARRY (CA)

(916)551-1715

HIGH PRIORITY SOUGHT FOR MINOR USE CHEMICALS

(From *California-Arizona Farm Press*, September 3, 1994)

"Washington - Senator Daniel Inouye, D-Hawaii, has drafted a report to accompany the Environmental Protection Agency's fiscal 1995 spending bill, urging that EPA give high priority to minor use crop chemicals."

"The action came at the request of the Minor Crop Farmer Alliance, whose representatives worked with the senator to create the report language."

"Many agricultural organizations have expressed concern that several chemicals used by farmers on small acreage crops or specialty crops may be lost because the manufacturers feel the costs associated with EPA's re-registration process are too great."

"The Minor Crop Farmer Alliance believes EPA could be doing more administratively to alleviate this problem."

"Inouye requested Sen. Barbara Mikulski, D-Md., chairwoman of the subcommittee with oversight for EPA spending authority, to include the minor use crop chemicals report language."

"The EPA spending bill was reported from the full committee and puts the committee on record in support of EPA giving priority to developing solutions to issues relating to minor use crop chemicals."

"The committee is aware of the critical situation facing minor crops due to the loss - for economic, not food or public safety reasons - of existing tools for the control of pests and diseases,' the report said."

"The committee directs EPA to give high priority to this issue, including the implementation of as many of the provisions of Senate Bill 985 as possible, where the agency determines it already has sufficient legal authority to do so."

CONTACT: JACK BARRY (CA)

(916)551-1715

INTERAGENCY EXPERIENCE FOR JESUS COTA

Jesus A. Cota, Assistant Director responsible for the national pesticide program in the Washington Office, has accepted a 1-year assignment as the Department of Agriculture's Liaison Officer with the Hispanic Association of Colleges and Universities (HACU). HACU is a national organization representing 126 Hispanic-serving Institutions (HSI) of higher education where Hispanics constitute a minimum of 25 percent of the total enrollment. Jesus will begin his new assignment in November and will provide two-way liaison between the Department and HACU. The purpose of his position is to provide guidance and assistance in linking the HSI's to opportunities within the Department of Agriculture such as employee recruitment, public information activities, and community outreach in the areas of food, agriculture and natural resources. Jesus's presence will be greatly missed around the Washington Office. Congratulations from all of FPM and the Pesticide Coordinators!

CONTACT: ANN BARTUSKA (DC)

(202)205-1600

PESTICIDES - LITTLE CANCER RISK

(From *California-Arizona Farm Press*, September 3, 1994)

"Bruce Ames, nationally known biochemistry professor at the University of California, Berkeley, recently reported that cancer is mostly related to age and not to synthetic pesticides."

"In his studies, Ames found that DNA in every cell is damaged up to 10,000 times daily. While our cells do have mechanisms to repair DNA damage, these mechanisms are imperfect because a majority of our bodies' resources are devoted to reproduction and not to maintenance. Thus, the number of unrepaired and mutated DNA increases with time, he says, and is thought to contribute to the incidence of cancer and to other age-related illness."

"Synthetic pesticides, according to Ames, represent little cancer risk to humans. He explained that plants, unlike animals, are immobile and do not have the ability to flee a threat to their survival. Therefore, plants are chemical factories that produce many natural pesticides that protect them from fungi, insects and predators."

"Ames estimates that 99.99 percent of the total pesticides that we ingest are natural and only .01 percent are synthetic. Thus, he says too much of our nations' resources are used in regulating pesticides and other synthetic chemicals, relative to the risks they pose in causing cancer."

CONTACT: JACK BARRY (CA)

(916)551-1715

ELM LEAF BEETLE CONTROL

Previously we reported conduct of a study sponsored by University of California (UCD) Statewide IPM Program, Entotech, and the City of Davis (CA). Trees were treated during May and June with *Bacillus thuringiensis* subspecies *tenebrinois* produced by NOVO and sold as Novodor. The spray was applied by the CURTEC air supported hydraulic sprayer. Visual examination of the treated and untreated elms in Davis shows the effectiveness of the treatment. Untreated trees are defoliated, treated trees are green. UCD will be reporting results of this and concurrent studies.

CONTACT: JACK BARRY (CA)

(916)551-1715

CALL FOR ARTICLES

Please forward to me by the 7th of next month all articles, meeting announcements, publications, reports, or other items of interest that you would like included in the next issue of Short Subjects and Timely Tips. Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary or abstract that doesn't exceed one page in length. Please include the name, State, and telephone number of the individual who can be contacted for further information.

CONTACT: PAT SKYLER (CA)

(916)551-1715

FAX (916)757-8383

DG: P.SKYLER:R05H

PUBLICATIONS AND REPORTS

Ciesla, W.M. 1993. Assessment of dwarf mistletoe and other factors affecting the health of juniper forests in Baluchistan. PAK/88/071. Forest Resources Division, Forestry Department, Food and Agriculture Organization of the United Nations, Rome, Italy.

Cielsa, W.M. 1993. Decline and mortality of *Acacia nilotica* in riverine forests of the Blue Nile. GCP/SUD/047/NET. Forest Resources Division, Forestry Department, Food and Agriculture Organization of the United Nations, Rome, Italy.

Ciesla, W.M. 1994. Assessment of the 1994 outbreak of nun moth, *Lymantria monacha*, in Poland and proposed pest management activities. FO 2/354. Forest Resources Division, Forestry Department, Food and Agriculture Organization of the United Nations, Rome, Italy.

Ciesla, W.M. 1994. Top dying of sundri, *Heritiera fomes* in the Sundarbans: An analysis of causal factors and management options. BGD/84/056. Forest Resources Division, Forestry Department, Food and Agriculture Organization of the United Nations, Rome, Italy.

Ciesla, W.M., D.K. Mbugua, and J.G.D. Ward. 1994. Preliminary observations on dieback and mortality of *Juniperus procera* in Kenya. FO:DP/KEN/91/005, Field Document 6. Integrated Forest Pest Management Centre, Ministry of Environment and Natural Resources, Kenya and Forest Resources Division, Forestry Department, Food and Agriculture Organization of the United Nations, Rome, Italy.

Onken, A., R. Reardon, and J. Barry. 1994. Diflubenzuron - update no. 1. USDA Forest Service, National Center of Forest Health Management, Morgantown, WV.

Teske, M. 1994. FSCBG predictions coupled with GPS/GIS aircraft tracking. Prepared for presentation at *ASTM 15th symposium on pesticide formulations and application systems*. Phoenix, AZ.

Windell, K. 1994. FY 94 - Progress report - Thermal insect control. TA&S #4E32P11. USDA Forest Service, Missoula Technology & Development Center, Missoula, MT.

The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, CA 95616 or by DG to P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
USDA Forest Service Promotes Bartuska to Director of Forest Pest Management	1-2
1994 Pesticide Coordinators Meeting	2
NAPIAP Call Letter for Request for Proposals is Delayed	2
Favorable Court Ruling from the Eighth Circuit Court of Appeals in Region 9	3
New Publication	3
Methyl Bromide Alternatives Workshop Scheduled	3
Helicopter Side Wash Study	4
GPS Navigation Demonstration	4
Use Big Print on Labels	5
Packaging Bugs for Biocontrol Duty	5
National Institute for the Environment	6-7
EPA and Public Involvement	7
PC in the Hospital	7
Call for Articles	8
Publications and Reports	8

USDA FOREST SERVICE PROMOTES BARTUSKA TO DIRECTOR OF
FOREST PEST MANAGEMENT

(From USDA Forest Service News Release, Washington, D.C.)

"WASHINGTON, D.C. August 5 - USDA Forest Service Chief Jack Ward Thomas announced today that Dr. Ann Bartuska has been selected to be Director of Forest Pest Management in the State and Private Forestry organization in the Washington Office. As Director, she will oversee the coordination of forest health activities for the Agency. She succeeds Jim Space who recently became Director of the Forest Service's Pacific Southwest Forest and Range Experiment Station."

"Dr. Bartuska most recently was a Special Assistant to the Chief serving as the Forest Service's Liaison to the National Biological Survey. Previously, she was Acting Director of the Ecosystem Management staff in the Forest Service's Washington Office. She has also served as a Wetland Staff Specialist for the Agency's Forest Environment Research staff and was responsible for developing

National Wetlands Research Program and coordinating wetlands research within the Forest Service and with other agencies and institutions. She has been with the Agency for 7 years.”

“Her other positions have included Assistant Director of the Forest Service’s Southeastern Forest Experiment Station in Asheville, North Carolina, Program Coordinator for the Acid Deposition Assessment Program, and Visiting Assistant Professor in the School of Forest Resources at North Carolina State University.”

“Dr. Bartuska, a native of Philadelphia, PA, received a B.S. degree in Biology from Wilkes College, Wilkes Barre, Pennsylvania in 1975. She then went on to earn an M.S. degree in Botany (Plant Ecology) from Ohio University, Athens, Ohio in 1977, and Ph.D. in Biology from West Virginia University in Morgantown, West Virginia in 1981. Her thesis research examined detrital processes in disturbed ecosystems.”

“Bartuska’s husband, Mark Walbridge, is a Wetlands Ecologist at George Mason University.”

CONTACT: MEL WEISS (DC)

(202)205-1600

1994 PESTICIDE COORDINATORS MEETING

The 1994 Annual Pesticide Coordinators meeting will be held during the week of October 24-28, 1994, at the Fountain Suites Hotel in Sacramento, CA (916)441-1444 or 1(800)767-1777. When making reservations, mention you will be attending the “Pesticide Coordinators Meeting” to get the government rate. The hotel is very close to the Sacramento airport and shuttle service is available. Region 5 is hosting the meeting and has planned a 1 day field trip to the Eldorado National Forest. A committee has been formed to organize the agenda and further details. Members include: John Borrecco, Region 5; Ed Monnig, Region 1; Jim Brown, Region 8; Dave Bakke, Eldorado National Forest, Region 5; a representative of Sierra Pacific Industries, Placerville, CA; and Dave Thomas, FPM, WO. An announcement letter with a detailed agenda will follow shortly.

CONTACT: DAVE THOMAS (DC)

(202)205-1600

NAPIAP CALL LETTER FOR REQUEST FOR PROPOSALS IS DELAYED

The call letter requesting proposals for NAPIAP grant funding will be delayed this year. Typically, the letter goes out of the Washington Office on August 1, with a reply due date of August 31. The Washington Office has decided to delay the call letter, and in the meantime, reevaluate what data gaps currently exist. Gary Smith from Region 6 has agreed to come into the Washington Office to assist in identifying the data gaps.

CONTACT: JESUS COTA (DC)

(202)205-1600

FAVORABLE COURT RULING FROM THE EIGHTH CIRCUIT COURT OF APPEALS IN REGION 9

On July 13 a panel of three judges within the Eighth Circuit Court of Appeals issued a favorable decision to the Forest Service in an appeal filed in the lawsuit Minnesota Pesticide Information and Education v. Espy, et. al. In a previous U.S. District Court ruling, the judge ruled that a decision made by the Forest Supervisors on the seven national forests in the Lake States not to use herbicides did not violate the National Environmental Policy Act. The plaintiffs contended that an environmental impact statement to investigate the effects of deciding not to use herbicides was required. The Eighth Circuit Court of Appeals affirmed the District Court's decision.

CONTACT: DAVE THOMAS (DC) (202)205-1600

NEW PUBLICATION

Finally out in print – publication FS-393S “Adiestramiento en Seguridad para la Aplicacion de Hierbicides Forestales” the Spanish translation of “Safety Training for Forestry Herbicide Applicators” by Max Williamson and Charles Shade (1986). This is a translation (done at the University of Puerto Rico) of the standard training manual used in the Southern Region's pesticide applicator certification training. While somewhat idiomatic, it is an effective tool for use in training Spanish speaking field crews. For more information -

CONTACT: PAUL MISTRETTA (GA) (404)347-2961

METHYL BROMIDE *ALTERNATIVES* WORKSHOP SCHEDULED

Weyerhaeuser Company, Nursery Technology Cooperative and Oregon State University, College of Forestry are sponsoring the “Methyl Bromide *Alternatives* Workshop” to be held October 5-6, 1994 at the Tyee Conference Facility, Tumwater, WA. Intended audience is forest nursery managers, foresters, and researchers. The workshop objective is to review the current status of methyl bromide and the impact its loss will have and to discuss current and potential research on alternatives. For additional information contact: Conference Assistant, College of Forestry, Oregon State University, Peavy Hall, Room 202, Corvallis, OR 97331-5707, Tel: (503)737-2329, Fax: (503)737-2668.

CONTACT: DAN KUCERA (PA) (610)975-4123

HELICOPTER SIDE WASH STUDY

FPM (WO/Davis), Intermountain Station (INT) and U.S. Army are cooperating on a field study to characterize rotor side wash from helicopters. FPM has interest in modeling pesticide drift, Intermountain Station has interest in fire-spread caused by side wash, and U.S. Army has interest in dust and debris hazards to personnel. Continuum Dynamics, Inc. of Princeton, NJ is providing the vertical towers and instrumentation, and is using the AGDISP spray model developed by FPM for the analyses. Costs are being shared by the three sponsors/cooperators. The first series of tests were conducted at Yuba City, CA the week of July 25th under direction of Chuck George, INT. Helicopters characterized included the Chinook, Sikorsky S61, Bell 205H, Bell 206, and Blackhawk.

CONTACT: JACK BARRY (CA)
 CHUCK GEORGE (MT)
 BRUCE GRIM (UT)

(916)551-1715
(406)329-4815
(801)831-3371

GPS NAVIGATION DEMONSTRATION

USDA Forest Service, Forest Pest Management, is sponsoring a demonstration and evaluation of GPS aircraft navigation equipment. The program is being conducted by the Missoula Technology and Development Center (MTDC) and will be held near Missoula, MT. Demonstrators are confirmed for October 11-12, 13-14, and 17-18 (with more dates still to be scheduled). The objectives of the program are outlined in a test plan available from Harold Thistle (MTDC). One of the objectives of the demonstration is to familiarize potential users with this technology and to encourage the integration of this technology into current operational methods. To achieve this objective, the program is open to anyone interested in observing this technology at work. The format of the program will allow observers to meet the people involved in the development and implementation of this technology. This should be an excellent forum for discussing specific needs and presenting the GPS aircraft navigation industry with your, or that of your staff's, experience and expectations regarding their products. General questions regarding the project should be directed to Harold Thistle (406)329-3981 (H.Thistle:R01A). Questions regarding scheduling and accommodations should be directed to Dave Rising (406)329-3904 (D.Rising:R01A). Invitations are being sent to Forest Service personnel and cooperators who have expressed interest in observing the demonstration. The demonstration is open to all who have an interest.

CONTACT: JACK BARRY (CA)
 HAROLD THISTLE (MT)

(916)551-1715
(406)329-3981

USE BIG PRINT ON LABELS

(From *Resource - Engineering & Technology for a Sustainable World*, July 1994)

"A Wyoming research team that studied labels on pesticides found many are too difficult to read. Their conclusion: People may not be using the pesticides correctly, which could endanger them and the environment."

"The researchers said the print on the labels is too small, and the contrast between the print and background is often poor. Further, a person must read at the 11th grade level to understand pesticide label directions. That means 40% to 50% of American adults can't understand the labels on pesticides."

"Federal regulations require pesticide labels to have at least 6-point type, the same size type found in telephone books. The researchers found many labels do not meet the requirement."

"About half of 3,000 Wyoming residents surveyed said they always read all of the pesticide label. Nearly one-third of the others said they don't read the entire label because it is too much to read. Ranchers over age 60 and having no more than a high school education were most likely to say they didn't read the label because they 'know what to do.' " (*Ag Retailer*, April/May).

CONTACT: JACK BARRY (CA)

(916)551-1715

PACKAGING BUGS FOR BIOCONTROL DUTY

(From *Resource - Engineering & Technology for a Sustainable World*, July 1994)

"Some beneficial bugs now travel in specially designed, pillow-case-size bags to get safely to fields infested by crop pests."

"In pilot studies, scientists hauled 5,000 to 10,000 tiny braconid wasps - foes of Caribbean fruit flies - per bag. The bags are cheaper and take up less space than the cages typically used, and insects can rest on the bag's walls without piling on top of each other."

"Scientists say bags could bus other insects headed for biocontrol duty."

For additional information -

CONTACT: JOHN SIVINSKI (FL)

(904)374-5791

NATIONAL INSTITUTE FOR THE ENVIRONMENT

(From *Resource - Engineering & Technology for a Sustainable World*, July 1994)

“Why Support a National Institute for the Environment?”

“Q What is the National Institute for the Environment?”

“A The proposed National Institute for the Environment would improve the scientific basis for making decisions on environmental issues through research, knowledge assessment, data and information management, and education and training. These activities would be integrated within the new federal agency.”

“Q What are some examples of the kinds of research NIE might support?”

“A Some examples are:

- What are the impacts of regulatory systems on the quality of the environment and the economy?
- How does one identify and maintain sustainable use of renewable and nonrenewable resources?
- Development of tools for ecological risk assessments.
- How does one analyze the environmental 'life cycles' of manufactured products?
- What is the potential for wetlands' and other ecosystems' remediation?”

“Q Who else would serve on the Board of Governors?”

“A The board would be composed of scientists, engineers, resource managers, policy analysts, industrialists, environmentalists and other groups whose activities affect natural resources. Members would serve long, overlapping terms and be appointed by the president with the advice and consent of Congress.”

“Q How much is NIE going to cost? And where is the money going to come from?”

“A The Senate bill to create NIE includes an authorization for \$100 million for startup costs. In subsequent years, we expect the research cost to grow as critical environmental needs are recognized and prioritized by the Board and Congress.”

"The Administration may reallocate funds from the defense R&D budget. As the vision of national security shifts to include environmental security, support for environmental R&D is likely to grow."

For additional information -

CONTACT: DAVID BLOCKSTEIN (DC)
(COMMITTEE FOR THE NIE)

(202)628-4303

EPA AND PUBLIC INVOLVEMENT

The U.S. Environmental Protection Agency (USEPA) is asking for recommendations on how it can increase public involvement regarding pesticide risk reduction decisions. Of particular interest is how to better involve the public in settlement agreements. The Office of Inspector General at USEPA concluded that such agreements do not always provide for adequate public participation. Written comments, with reference to OPP-50787, should be sent to the Public Response Branch of USEPA by 10/10/94.

For additional information contact:
Mr. Joseph E. Bailey
EPA, Special Review Branch
Phone 703 308-8173
Fax 703 308-8041

Send comments to:
Public Response Branch (7506C)
EPA, Office of Pesticide Prog.
401 M Street, SW
Washington, DC 20460

Contact: Jesus A. Cota (DC)

(202)205-1600

PC IN THE HOSPITAL

The Pesticide Coordinator for Region 8 in Atlanta, Georgia, Paul Mistretta, checked into the hospital for surgery. Paul is having hip surgery and bone reconstruction performed and will be gone from the office for the rest of the year. Even though he will be away from the office, Paul plans to stay reasonably available through the Data General. We pray that Paul's surgery is successful and wish him a speedy and painless recovery.

Contact: Jesus A. Cota (DC)

(202)205-1600

PUBLICATIONS AND REPORTS

Giles, K. 1994. Agricultural sprays: Demands and accomplishments in precision spraying. To be presented at *ILASS AMERICAS - 94 - 7th annual conference on liquid atomization and spray systems*. Seattle, WA.

Skyler, P.J. (Ed.). 1994. FSCBG/AGDISP model technology transfer letter. Issue No. 5. USDA Forest Service, Forest Pest Management, Davis, CA.

Sundaram, A. 1994. Drop-size spectra and deposits of four *Bacillus thuringiensis* formulations on simulated and natural fir foliage. Transactions of the ASAE, 37(1):9-17.

(Please send your references for posting in "Short Subjects and Timely Tips.")

CONTACT: PAT SKYLER (CA)

(916)551-1715

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House Bills -

H.R. 4091 - Rep. Waxman (D-CA)

A bill to amend the Federal Food, Drug and Cosmetic Act to revise the authority under that Act to regulate pesticide chemical residues in food.

H.R. 872 - Rep. Waxman (D-CA)

A bill to amend the Federal Food, Drug and Cosmetic Act (FFDCA) to regulate pesticide chemical residue in food.

H.R. 967 - Rep. de la Garza (D-TX)

A bill to amend the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) with respect to minor use pesticides.

H.R. 1692 - Rep. Andrews (D-TX)

A bill to renew until January 1, 1997, the previous suspension of duty on certain chemicals.

H.R. 1897 - Rep. Dooley (D-Ca)

A bill to amend FIFRA with respect to public health pesticides.

H.R. 2296 - Rep. Bilirakis (R-FL)

A bill to amend the Solid Waste Disposal Act to exempt pesticide rinse water degradation systems from subtitle C permit regulations.

H.R. 3969 - Rep. Boehner (R-OH)

A bill to amend FIFRA to provide State, Federal and Tribal agencies sufficient time to implement certain pesticide safety training programs.

Senate Bills -

S. 331 - Sen. Kennedy (D-MA)

A bill to amend FFDCA to revise the authority under the Act to regulate pesticide chemical residues in food.

CONTACT: JESUS COTA (DC)

(202)206-1600

CALIFORNIA DEPARTMENT OF PESTICIDE REGULATION REGISTERS M-PEDE FOR USE AGAINST AFRICANIZED BEES

California Department of Pesticide Regulation has granted a special local need registration (Section 24(c)) for the use of an insecticidal soap against Africanized honey bees. Tests have shown that insecticidal soaps are as effective and less toxic to humans than other chemicals currently registered for bee and wasp control in California.

Under the terms of the special registration, the pesticide, M-Pede, manufactured by Mycogen Corp. of San Diego, can be used against bee swarms by police officers, fire fighters, vector control specialists, and other government employees who are responsible for responding to Africanized honey bee situations. It may also be used by pest control professionals who have received industry certification in control of the bees.

The product is designed to be used on bee swarms and exposed colonies. It is not intended for use on human beings or animals. The product is effective because bees cannot fly when their wings are wet, and the soapy water penetrates their breathing tubes, suffocating them.

The Africanized honey bee looks identical to the docile European honey bee common in the United States. The major difference is that Africanized bees are very defensive, and large numbers of bees have been known to attack animals or persons who approach their nests.

CONTACT: LAURA D. MERRILL (CA)

(909)383-5588

R5 FEIS GETS FAVORABLE RULING FROM NINTH CIRCUIT COURT OF APPEALS

July 5, 1994, the Ninth Circuit U.S. Court of Appeals in San Francisco affirmed a District Court summary judgment in favor of the Forest Service by upholding the adequacy under NEPA of the Pacific Southwest Region's Final Environmental Impact Statement for Vegetation Management for Reforestation. The appeal by Salmon River Concerned Citizens, California Coalition for Alternatives to Pesticides, Safe Alternatives for Our Forest Environment and Northcoast Environmental Center charged that the District Court erred when it concluded that the FEIS did not violate NEPA. Appellants argued on appeal that the FEIS:

Inadequately analyzed cumulative impacts of herbicide use,

failed to consider inert ingredients, and

failed to adequately discuss risks of herbicide exposures to highly sensitive individuals.

The ninth Circuit stated that it was “compelled...to reject claims...that the FEIS fails to adequately address cumulative effects, evaluate inert ingredients, and disclose and evaluate the risks to chemically sensitive individuals.” The Court, upholding the District Court, found that the FEIS:

Provided a reasoned analysis and disclosure of the evidence regarding inert ingredients,
expressly considers the effects of herbicide exposure on chemically sensitive individuals, and
complied with NEPA in the analysis of cumulative impacts.

Background: In 1984 the Forest Service suspended use of herbicides on national forests in California pending preparation of an environmental impact statement reviewing all methods used in reforestation. The Pacific Southwest Region issued a Final Environmental Impact Statement for Vegetation Management for Reforestation in December 1988 which analyzed the effects of a range of reforestation methods including herbicides on the environment and human health and safety. The Regional Forester issued his Record of Decision in February 1989. Administrative appeals to the decision were filed. In June 1989, the Chief of the Forest Service agreed to delay implementation of the FEIS pending his decision on the appeals. In January 1991, the Chief upheld the Regional Forester’s decision and lifted the moratorium on use of herbicides. The appellants listed above filed suit in the U.S. District Court for the Eastern District of California in 1991 and the District Court issued a summary judgment in favor of the Forest Service in 1992. The appellants filed an appeal of this decision. The parties submitted their arguments on the appeal in the Fall of 1992 and oral argument took place in October 1993. The Ninth Circuit denied appellants’ appeal on July 5, 1994.

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JOHN FISKE (CA)

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(415)705-2697

UPDATE ON REGISTRATION OF BORAX AND TIM-BOR FOR ANNOSUS ROOT DISEASE CONTROL

U.S. Borax is in the process of changing their “20 Mule Team Boxax” label to allow the reformulation (repackaging) of their product. This means that Wilbur-Ellis will be able to purchase the borax and repackage as “Sporax” for use in preventing annosus root disease. Estimate two to four months for this to be completed. “Sporax” should be available sometime next calendar year.

U.S. Borax is also dropping the annosus treatment from their “Tim-Bor Insecticide” label. Part of the reason is that U.S. Borax only wants to market “Tim-Bor” as a structural product thereby avoiding the new requirements under the Worker Protection Standard. Supplies of “Tim-Bor” with the annosus use on the label can be used until supplies are exhausted. Wilbur-Ellis is planning on purchasing enough “Tim-Bor” currently labeled for annosus root disease to meet our treatment needs for the remainder of this field season or until “Sporax” is available. The possibility also

exists in the future for Wilbur-Ellis to repackage "Tim-Bor" under their own product name and label.

CONTACT: JOHN BORRECCO (CA)

(415)705-2873

GYPSY MOTH NEWS

The June 1994 Issue No. 35 of *Gypsy Moth News* covers defoliation history, spray history and insecticide use and cost of spraying for eastern U.S. This is an excellent reference - thanks to Daniel B. Twardus and his staff for sharing this information.

CONTACT: JACK BARRY (CA)

(916)551-1715

PESTICIDE USAGE IN THE U.S.

The Environmental Protection Agency (EPA) has recently made available a document entitled, "Pesticide Industry Sales and Usage - 1992 and 1993 Market Estimates". This 33-page document summarizes through charts and figures the current status of pesticide usage in the U.S. Copies of the document may be obtained without cost by requesting publication number 733-K-94-001 from EPA by mail at NCEPI, P.O. Box 42419, Cincinnati, OH 45242-2419, or by calling (513)891-6561.

CONTACT: JESUS COTA (DC)

(202)205-1600

PESTICIDE EXPOSURE TO CHILDREN

(From *California-Arizona Farm Press*, July 2, 1994, p. 28).

"State Health Director Kim Belshe has praised the cooperative work of state and federal agencies in producing the report 'A Joint Review of Existing Federal and State Pesticide Registration and Food Safety Programs.' The report evaluates the efforts of state and federal regulatory programs to protect infants and children from the effects of pesticide residues in food."

"This report makes a valuable contribution to our efforts to ensure that our food supply is safe,' Belshe said. 'Consumers can rest assured knowing that the key to a healthful diet has not changed - eat at least five servings of fruits and vegetables daily.'"

"Staff of the California Department of Health Services joined with staff of the Office of Environmental Health Hazard Assessment and the Departments of Pesticide Regulation and Food and Agriculture in preparing the report."

The report covers Toxicity Assessment, Dietary Exposure Assessment, Risk Assessment Issues, Evaluation and Recommendations/Implementation. Any portion of the report may be reproduced for any but profit-making purposes. For information on purchasing additional copies, contact the Department of Pesticide Regulation, 1020 N Street, Sacramento, CA 95814.

CONTACT: JACK BARRY (CA)

(916)551-1715

BUGS IN YOUR COMPUTER?

(From *Business Week*, March 7, 1994)

"Scientists at the U.S. Agriculture Dept.'s Systematic Entomology Laboratory in Washington identify some 100,000 insect specimens a year. A misidentification can be extremely costly: A cargo of food could be needlessly impounded at the border, or one loaded with harmful insects could be unwittingly admitted. Yet there's a shortage of trained taxonomists - and the written keys to taxonomy are hard to use, requiring that traits be looked up in a specific order."

"Computers are coming to the rescue. An Agriculture computer program that is now under development lets inspectors tap into data bases that categorize species by their individual traits. With each characteristic entered, the computer eliminates species that don't fit the bill, until the field narrows to one choice. So far, the software can handle only fruit flies. Other insects, seeds, and plants will be added to the data base. While Agriculture's system requires the operator to use technical lingo, several companies are working on programs that are easier for nonscientists to use."

CONTACT: JACK BARRY (CA)

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CONTACT: CRAIG HOWARD (ONTARIO, CANADA)
LISA BUSE (ONTARIO, CANADA)

(705)949-9461
(705)946-2981

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CONTACT: EILEEN HARVEY (ONTARIO, CANADA) (705)949-9461

GYPSY MOTH IN MICHIGAN

Michigan State University Extension and Department of Entomology at Michigan State University, and the Michigan Department of Agriculture have updated their Extension Bulletin E-2302, *Gypsy Moth in Michigan - Homeowner's Guide*. This large format publication of 8 pages covers a range of articles on gypsy moth life cycle, risk and management for home and woodlot owners. The bulletin also lists educational materials and a glossary. Copies are free and available from: Michigan State University Extension, E. Lansing, MI 48824.

CONTACT: JACK BARRY (CA) (916)551-1715

CALL FOR ARTICLES

Please forward to me by the 12th of next month all articles, meeting announcements, publications, reports, or other items of interest that you would like included in the next issue of Short Subjects and Timely Tips. Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary or abstract that doesn't exceed one page in length. Please include the name, State, and telephone number of the individual who can be contacted for further information.

CONTACT: PAT SKYLER (CA) (916)551-1715
FAX (916)757-8383
DG: P.SKYLER:R05H

PUBLICATIONS AND REPORTS

Bush, P.B., J.W. Taylor and J.W. Barry. 1994. FSCBG: A management tool for aerial pesticide application. ASAE Paper No. 941030. Presented at *ASAE 1994 international summer meeting*. Kansas City, MO, 19-22 June.

Campbell, R.A. and C.A. Howard. 1994. Priorities for forestry herbicide application technology research. *Can. J. For. Res.* Vol. 23, pp. 2204-2212.

Ghent, J.H. and D.B. Twardus. 1994. The spray swath of the DC-3 for gypsy moth suppression using *Bacillus thuringiensis*. NA-TP-05-94. USDA Forest Service, Northeastern Area, State and Private Forestry, Radnor, PA.

Lowe, W.J., L.R. Barber, R.S. Cameron, G.L. DeBarr, G.R. Hodge, J.B. Jett, J.L. McConnell, A. Mangini, J. Nord, and J.W. Taylor. 1994. A southwide test of *bifenthrin* (Capture®) for cone and seed insect control in seed orchards. *South. J. Appl. For.* 18(2):72-75.

Teske, M.E., J.W. Barry, and J.E. Rafferty. 1994. An examination of spray penetration through scrub oak canopies. ASAE Paper No. 941031. Presented at *ASAE 1994 international summer meeting*. Kansas City, MO, 19-22 June.

Thistle, H.W. Jr., M.E. Teske and J.W. Barry. 1994. Penetration of aerially released spray material into forest canopies: A review of early work. ASAE Paper No. 941029. Presented at *ASAE 1994 international summer meeting*. Kansas City, MO, 19-22 June.

Zalom, F., J. Barry, W. Johnson, G. Kirfman, J. Conley, and J. Connell. 1994. Bloomtime aerial applications of *Bacillus thuringiensis* for control of peach twig borer. Poster presented at *Second National IPM Symposium/Workshop*. Las Vegas, NV, 19-22 April.

The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, CA 95616 or by DG to P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
Update on Deer Repelling Garlic Units	1-2
Pests Get Really Attached to These Ribbons	2
1994 New England Management Recommendations for Insects, Diseases, and Weeds of Shade Trees and Woody Ornamentals	3
International Congress of Pesticide Chemistry - Options 2000	3
Interpreting Personal Protective Equipment (PPE)	
Statements on Pesticide Labels	4-5
Dow Opens Office in Sacramento	5-6
Deet Insect Repellent	6
More on Pesticides in Fruits/Vegetables	6-7
California EPA - Science vs Public Values	7
Tracking Pesticide Injuries	7-8
Pesticide Exposure	8
DoD Aerial Pesticide Application Course	9
Forest Vegetation Management Conference - "Stand Establishment and Inter-Rotational Management"	9
Advanced Forest Herbicides Course	9
Integrated Forest Pest Management Course	10
Call for Articles	10
Publications and Reports	10-11

UPDATE ON DEER REPELLING GARLIC UNITS

In Issue No. 93-5, we reported on a new deer repelling device, Plant Pro-Tec (Garlic Units). At that time the device was registered by U.S. EPA, but not registered for use in California. The product has now received California registration.

Recently, the Animal Repellents Steering Committee represented by personnel from Regions 5 and 6, Missoula Technology and Development Center, PNW Station, and APHIS reviewed the APHIS-ADC efficacy testing conducted at Olympia, WA. Repellency was compared using Plant Pro-Tec (Garlic) Units and Deer-Away Big Game Repellent powder and liquid spray formulations. Results with the Plant Pro-Tec on western redcedar (a highly palatable species) were not promising. However, this doesn't mean that the garlic units would not be effective on a less palatable species. Caution is advised before becoming involved in any widespread application of the Plant Pro-Tec technology. As previous repellent tests have shown, the BGR powder formulation continues to be the most effective deer repellent available.

The Steering Committee recommended that monitoring of effectiveness be conducted for any operational applications of the Plant Pro-Tec (Garlic) Units in support of the research efforts. Region 5 is requiring all of their Forests that want to try the new product to develop a monitoring plan following a protocol developed by Dan L. Campbell, APHIS-ADC, Forest Animal Damage Research Station, Olympia, WA. The objective is to collect operational monitoring data that is compatible with efficacy data being collected by the researchers. Copies of the monitoring protocol are available on DG from J.Borrecco:R05A.

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PESTS GET REALLY ATTACHED TO THESE RIBBONS

(From McClatchy News Service)

“FRESNO - Like yellow ribbons 'on the old oak tree' in the song, yellow banners stretching along rows in some vineyards throughout California are sending a message of welcome.”

“But what the 6-inch-wide plastic runners are welcoming are vineyard pests, which are trapped on the sticky surface of the banners.”

“The device, called a 'Hopperfinder,' is a product of a corporation called Entosphere, owned jointly by Paul Wulf of Madera and A. Roy Davies of Kimpton, Hertfordshire, England.”

“The Hopperfinder, Wulf said, essentially is 'a 1,500-foot-long piece of flypaper' designed to monitor and trap grape leafhoppers and variegated leafhoppers in vineyards. It's yellow because that color attracts the insects.”

“At the moment, it's the prime product of Entosphere, but Wulf said the company also has a full line of pheromone-based products for monitoring and mass-trapping insects.”

“Most of the products are geared to agriculture, but some have applications in the home and garden market, Wulf said.”

“Wulf and Davies, who do similar work in their respective countries, met through a friend and decided to form a company for joint projects in 1991.”

“The Hopperfinder was introduced in trials in 1992 and went on the market for the 1993 crop year. It is an environmentally friendly alternative to pesticides.”

CONTACT: JACK BARRY (CA)

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1994 NEW ENGLAND MANAGEMENT RECOMMENDATIONS FOR INSECTS, DISEASES, AND WEEDS OF SHADE TREES AND WOODY ORNAMENTALS

The University of Massachusetts Cooperative Extension System now has available its 248 page "1994 New England Management Recommendations for Insects, Diseases, and Weeds of Shade Trees and Woody Ornamentals". This manual covers virtually all the insects, diseases, and weed pests of woody plants in New England, and offers the latest pesticide label changes, integrated pest management for most of the pests, environmentally friendly alternatives, growing degree day information for most insect pests, fertilization, and a listing of low maintenance trees and shrubs. Not bad for \$20.00. Order from Bulletin Center, Cottage A, Thatcher Way, University of Massachusetts, Amherst, MA 01003. Checks payable to University of Massachusetts.

CONTACT: AMY SNYDER (NH)

(603)868-7716

INTERNATIONAL CONGRESS OF PESTICIDE CHEMISTRY-OPTIONS 2000

The Eighth LUPAC conference will be held in Washington, D.C., Sheraton Washington Hotel, July 4-9, 1994. Options 2000 will include the following main topics:

- Synthesis
- Metabolism
- Regulation
- Biotechnology
- Delivery
- Risk Assessment
- Resistance
- Residues
- Mode of Action
- Fate and Behavior

For program and registration information:

CONTACT: JACK BARRY (CA)

(916)551-1715

INTERPRETING PERSONAL PROTECTIVE EQUIPMENT (PPE) STATEMENTS ON PESTICIDE LABELS

Label Statement	Acceptable PPE	Label Statement	Acceptable PPE
Long-sleeved shirt and long pants	Long-sleeved shirt and long pants; or woven or nonwoven coverall; or plastic- or other barrier- coated coverall; or rubber or plastic suit	Waterproof gloves	Any rubber or plastic gloves sturdy enough to remain intact throughout task being performed
		Chemical resistant gloves	Barrier-laminate gloves; or other gloves that glove selection charts or guidance documents indicate are chemical- resistant to the pesticide for the period of time required to perform the task
Coverall worn over short- sleeved shirt and short pants	Coverall worn over short- sleeved shirt and short pants; or coverall worn over long-sleeved shirt and long pants; or cover- all worn over another coverall; or plastic- or other barrier-coated coverall; or rubber or plastic suit	Chemical- resistant gloves such as butyl or nitrile	Butyl gloves or nitrile gloves or other gloves that glove- selection charts or guidance documents in- dicate are chemical- resistant to the pesti- cide for the period of time required to perform the task
Coverall worn over long- sleeved shirt and long pants	Coverall worn over long- sleeved shirt and long pants; or coverall worn over another coverall; or plastic- or other barrier- coated coverall; or rubber or plastic suit	Shoes	Leather; canvas; or fabric shoes; or chemical-resistant shoes; or chemical- resistant boots; or chemical-resistant shoe coverings (booties)

Label Statement -----	Acceptable PPE -----	Label Statement -----	Acceptable PPE -----
Chemical-resistant apron worn over coverall or over long-sleeved shirt and long pants	Chemical-resistant apron worn over coverall or long-sleeved shirt and long pants; or plastic- or other barrier-coated coverall; or rubber or plastic suit	Chemical-resistant foot-wear	Chemical-resistant shoes; or chemical-resistant boots; or chemical-resistant shoe coverings (booties)
Chemical-resistant protective suit	Plastic- or other barrier-coated coveralls; or rubber or plastic suit	Chemical-resistant boots	Chemical-resistant boots
Waterproof suit or liquidproof suit	Plastic- or other barrier-coated coveralls; or rubber or plastic suit	Chemical-resistant hood or wide-brimmed hat	Rubber- or plastic-coated safari-style hat; or rubber- or plastic-coated fire-fighter-style hat; or plastic- or other barrier-coated hood; or rubber or plastic hood; or full hood or helmet that is part of some respirators

CONTACT: ED MONNIG (MT)

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DOW OPENS OFFICE IN SACRAMENTO

(California-Arizona Farm Press, May 21, 1994)

"Because of the unique nature of agriculture in the West, DowElanco is expanding its marketing presence there."

"Mike Muston has been named western regional manager and Scott Mueller has been named western market manager. Both will relocate to Sacramento, Calif., from DowElanco headquarters in Indianapolis, Ind."

"The West is an extremely important market for DowElanco that is truly distinct from the rest of the nation,' says Muston. 'From a crops, regulatory, and customer standpoint, the West requires a uniquely focused effort. We believe a greater presence there will enable DowElanco to be more responsive to the needs of Western agriculture."

“DowElanco’s move will allow the company to act more autonomously in the West. ‘The bottom line is that we are moving our focus closer to the customer,’ says Mueller. ‘Customer relationship development must be as important as product development’”

CONTACT: JACK BARRY (CA)

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DEET INSECT REPELLENT

(From FOCUS on Lyme Disease, Spring 1994)

More is not better!

“N, N-diethyl-m-toluamide (DEET) has been used as a highly effective insect repellent for over 30 years. It is very active against a wide spectrum of arthropods, especially some important mosquito vectors of disease (somewhat less effective against ticks). First formulated in 1953 and marketed in 1956, it is the most widely used repellent in the world today. According to the Chemical Specialties Manufacturers Association, up to 200 million people worldwide use DEET each year.”

“A wide variety of DEET products are available on the market with concentrations ranging up to 100%. In a shoppers’ survey of 42 products (conducted by Consumer Reports magazine, July 1993), about a third were at least 40% DEET, and about a fourth were 95-100% DEET. It appears that many people adhere to the addage that if a little is good, then a whole lot must be better. **NOT SO WITH DEET!**”

“It is the **formulation** that determines just how effective DEET will be. According to Carl Schreck, primary repellent researcher of the USDA Medical and Veterinary Entomology Research Laboratory in Gainesville, Florida, (personal communication, 1993), and to M.D. Buescher et al., efficacy data show no proportionate increase in repellency when DEET is used at concentrations higher than 40-50% in an ethanol base. And, continues Schreck, current controlled-release formulation technology can provide the same or better protection when DEET is formulated at levels of only 30-40%.”

CONTACT: JACK BARRY (CA)

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MORE ON PESTICIDES IN FRUITS/VEGETABLES

(From Sacramento Bee, May 22, 1994)

“Carl K. Winter, Ph.D., is a food toxicologist at the University of California, Davis, and the father of two toddlers.”

“‘My view as a toxicologist as well as a father is that it’s very difficult scientifically to make a strong case that there are grave concerns about pesticides in terms of food safety,’ said Winter, who runs UC Davis’ FoodSafe program. ‘The dose makes the poison, not simply the presence or absence of residue.’”

"He pointed to studies in which food is washed, prepared and cooked as most people would. Under those conditions, pesticide residue amounted to 1 percent of what's acceptable under federal guidelines, Winter said."

"He has no qualms about feeding conventionally grown produce to his own children. He is more concerned about people who cut back on fruits and vegetables because of pesticide concerns."

CONTACT: CARL K. WINTER (CA)

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CALIFORNIA EPA - SCIENCE VS PUBLIC VALUES

An Associated Press story appeared in *The Sacramento Bee* on 12 June 1994 about more attention being given to public values and attitudes. California EPA "may be paying less attention to scientific evidence and more attention to public values, attitudes and fears in determining environmental risk."

"The agency has prepared a new guide to risk assessment that seeks to include subjective factors in the decision-making process."

"The Los Angeles Times obtained a copy of the agency's 640-page report, titled the California Comparative Risk Project. Although the report has not yet been made public, it is already drawing criticism from business interests who fear the new criteria will add new layers of bureaucracy."

"It tells us to look at farm worker communities exposed to high levels of pesticides, children who are more vulnerable to respiratory diseases, or subsistence fishermen who may ingest dangerously high levels of mercury because they eat more fish," said Charles Shulock, the state EPA's chief deputy director of environmental health hazard assessment."

"The project divides environmental risks into three categories: human health, ecosystem health and social welfare."

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TRACKING PESTICIDE INJURIES

(From Utah Pesticide and Toxic News, Vol. 12, No. 5, May 1994)

"Physicians in California are required to report to the state illnesses and injuries that they believe may be related to pesticide use. Each of these reported cases is then investigated by the agricultural commissioner in the county where it occurred. California's Department of Pesticide Regulation (DPR) reviews results of the investigations to determine whether the illness or injury was related to pesticide exposure."

"In 1990 (the most recent reporting year available), the state received 2,995 illness reports. After investigation, 1,987 cases were classified as either possibly, probably or definitely related to pesticide exposure. Illnesses that occur outside the working environment are probably under-reported, according to DPR, because the majority of physician reports are made only when a worker is treated under workers' compensation."

"Interestingly, over two thirds of the 1990 cases involved non-agricultural uses of pesticides. Most of these were from exposures to disinfectants (which, because they kill germs and other pests, are classified as pesticides) used by employees of restaurants, janitorial companies, municipal water treatment plants, swimming pools, and hospitals. Injuries typically involved splashes into eyes or inhalation of vapors."

"Of the 615 cases that occurred in agriculture, cases reported among agricultural field workers were significantly lower than during most of the previous decade, possibly due to efforts such as lengthening the interval between applying a pesticide and allowing workers to re-enter a field, and removal of the insecticide phosalone from the market."

For more information, or for a copy of the 1990 report -

CONTACT: CALIFORNIA ENVIRONMENTAL
PROTECTION AGENCY

(916)654-0455

PESTICIDE EXPOSURE

(From Utah Pesticide and Toxic News, Vol. 12, No. 5, May 1994)

"Exposure studies show that when someone works with pesticides, the greatest amount of exposure occurs on the forearms and hands. In fact, the skin is the main route for chemical entry into the body. To reduce your risk, always wear chemical-resistant gloves. Rinse the gloves off before taking them off and then wash your hands before eating, drinking, smoking, or going to the bathroom. At the end of the day, wash your gloves and hands again. (UNBSN, 5/94)"

CONTACT: HOWARD DEER (UT)

(801)797-1600

DOD AERIAL PESTICIDE APPLICATION COURSE

Harold Thistle, Missoula Technology and Development Center (MTDC), taught a class on the effect of meteorology on aerial spray operations at the DOD Aerial Pesticide Course, USAFR, Youngstown, OH, June 13-17. The course was run by Capt. Doug Burkett and Lt. Col. Terry Biery of the US Air Force Reserve, both alumni of our Marana pesticide management courses. Capt. Burkett is an experienced user of the FSCBG aerial spray dispersion model and presented results from the model to the class. A typical project run by Lt. Col. Biery would involve mosquito suppression through space (drift) spraying from a C-130 flying at 150 feet above terrain. The purpose of this course is to provide DoD certification in EPA 11 Pest Control. There were approximately 60 people in the course including USDA employees seeking this level of certification. The Forest Service is welcomed to send students to future courses.

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FOREST VEGETATION MANAGEMENT CONFERENCE "STAND ESTABLISHMENT AND INTER-ROTATIONAL MANAGEMENT"

The Second International Conference on Forest Vegetation Management will be held at Rotorua, New Zealand, 20-24 March 1995. The themes are: Plant Competitive Effects; Forest Operations and Environmental Protection; and Regulatory, Training, and Management Support Systems. The abstract deadline is 1 August. The conference provides an opportunity to participate in world forestry. For more information:

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MacNichol, A.Z. 1994. C-47 aircraft spray deposition - Part 1: a statistical interpretation. FPM 94-11. USDA Forest Service, Forest Pest Management, Davis, CA 95616.

Mierzejewski, K., R. Reardon, W. McLane, N. Dubois, T. Roland, W. Yendol, and A. Onken. 1993. Evaluation of three application rates of *Bacillus thuringiensis*: Efficacy and deposit analysis. NA-TP-08-93. USDA Forest Service, Appalachian Integrated Pest Management, Morgantown, WV.

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Reardon, R., L. Venables, and A. Roberts. 1993. The Maryland integrated pest management gypsy moth project, 1983-1987. NA-TP-07-93. USDA Forest Service, Appalachian Integrated Pest Management, Morgantown, WV.

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The Washington Office, Forest Pest Management, Pesticide-Use Management and Coordination Group writes and distributes this informal newsletter as a means of providing current information to forestry pesticide users. Comments, questions, and items of input are welcome and may be sent to Pat Skyler, Editor, USDA Forest Service, 2121C Second Street, Davis, CA 95616 or by DG to P.Skyler:R05H. Reference to a commercial product or source in this newsletter does not constitute endorsement by the USDA Forest Service. Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or wildlife if they are not handled or applied properly. Use all pesticides in accordance with label precautions.

SHORT SUBJECTS
AND TIMELY TIPS
FOR PESTICIDE USERS

TABLE OF CONTENTS

Topic	Page No.
Registration Update on MCH	1
Reregistration Status of Gypchek and TM-Biocontrol-1	2
National Steering Committee Meetings	2
Paul Mistretta From Region 8 on Detail to FPM/WO	2
Worker Protection Standard Update	2-3
Estrogen-Mimicking Chemicals and Pesticides	3
Novo Nordisk Entotech, Inc. Expands Operations in Davis, CA	3-4
An Insecticide Delivery System for the Protection of Coniferous Seed Crops in Wild Stands	4
Low Volume Treatment of Single Trees	5
Challenging Elm Leaf Beetle With BT	5
Ecosystem Management, Restoration, and Herbicides	5
FSCBG/AGDISP Model Technology Transfer Letter	6
Weed Publications Available	6
EPA Endangered Species Coloring Book	6
ACS 1993 Fall National Meeting, Agrochemicals Division, Divisional Book Sales Price List	7
Call for Articles	7
Publications and Reports	8

REGISTRATION UPDATE ON MCH

On March 17, 1994, the Washington Office received letter notification from the U.S. Environmental Protection Agency on the status of the registration package for MCH. The package was submitted to EPA on May 4, 1993. The letter identified two deficiencies that need to be addressed. The first deficiency is the Forest Service requested a "Formulators Exemption" and MCH is not eligible for this type of registration. The second deficiency stated that toxicological data requirements on studies submitted in 1986 no longer meet EPA requirements. The Washington Office has responded to EPA to obtain detailed clarification on specifically what EPA wants the Forest Service to provide to expedite the registration process. Once EPA responds, the requested information will be developed and promptly sent to EPA.

CONTACT: DAVE THOMAS (DC)

(202)205-1600

REREGISTRATION STATUS OF GYPCHEK AND TM-BIOCONTROL-1

Approximately 3 months ago, the Washington Office received a "Data Call-in Notice" from the Environmental Protection Agency regarding the reregistration package previously submitted to EPA for Gypchek and TM-Biocontrol-1. EPA requested an updated literature search be completed for both products, and requested the Forest Service request data waivers for specific Tier 1 studies on nontarget organisms. The Washington Office submitted the literature search and request for data waivers to EPA on March 30 and is now awaiting a response.

CONTACT: DAVE THOMAS (DC)

(202)205-1600

NATIONAL STEERING COMMITTEE MEETINGS

The National Steering Committee for Managing Seed, Cone, and Regeneration Insects will be at Rhinelander, WI, June 28-30. Hosted by Steve Katovich, St. Paul Field Office, the three-day meeting includes a day-long field trip to orchard, old growth, and regeneration sites in northern Wisconsin. The National Spray Model and Application Technology Steering Committee will meet June 22 at Kansas City, MO. The National Steering Committee for Management of Western Defoliators met at Spokane, WA, April 12-13. Notes are in preparation.

CONTACT: JACK BARRY (CA)

(916)551-1715

PAUL MISTRETTA FROM REGION 8 ON DETAIL TO FPM/WO

Paul Mistretta, Region 8 Pesticide Coordinator, began a one-month detail to assist the Pesticide Use, Management and Coordination Staff in the Washington Office on April 25. Paul is providing assistance to FPM during the absence of Assistant Director, Jesus Cota, who has been selected to attend the Federal Executive Institute located in Charlottesville, Virginia for four weeks. Dave Thomas has been assigned as Acting Assistant Director.

CONTACT: DAVE THOMAS (DC)

(202)205-1600

WORKER PROTECTION STANDARD UPDATE

On April 5 the President signed legislation that will postpone implementation of a portion of the Worker Protection Standard (WPS) which the Environmental Protection Agency released in 1992. In April, 1994, EPA released a publication titled "Questions and Answers - The Worker Protection Standard: 1994 Legislative Changes, A Guide for Agricultural Employers". EPA also released a briefing paper titled "Worker Protection Standard Status". It includes a copy of the actual legislation. In the briefing there is a note on the activities currently being undertaken by EPA with

regards to WPS listed on page 2. The Washington Office is currently working very closely with EPA in obtaining clarification of the WPS as it applies to forestry. EPA is currently working on written clarification, and as soon as we receive it we will forward the information to the field. Dave Thomas is FPM's representative working with EPA. The recent publication and briefing paper were distributed to the field in Pesticide Advisory Memorandum No. 467.

CONTACT: DAVE THOMAS (DC)

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ESTROGEN-MIMICKING CHEMICALS AND PESTICIDES

Recently an issue surfaced in Region 5 concerning the possible linkage of estrogen-mimicking chemicals and pesticides, and the possible effect of causing reproductive and endocrine-disrupting disorders. Some of the herbicides and insecticides of concern include 2,4-D, 2,4,5-T, Alachlor, Amitrole, Atrazine, Metribuzin, Nitrofen, Trifluralin, Beta-HCH, Carbaryl, Chlordane, Dicofol, Dieldrin, DDT and metabolites, Endosulfan, Heptachlor and H-epoxide, Lindane, pyrethroids, Toxaphene and Transnonachlor (Colburn, T., et. al., Environmental Health Perspectives, 101 (5):378-384), October, 1993). The World Wildlife Fund in Washington, DC, has been following this issue for the past two years, as well as the Environmental Protection Agency and the National Academy of Sciences. A documentary on this issue titled "Assault on the Male" will be aired by the Discovery Channel in July. The World Wildlife Fund has agreed to let Forest Pest Management preview the documentary sometime in June. The March 21, 1994 issue of Newsweek Magazine had a feature article, the first in a series, on this issue. The Associated Press put this issue on the wire service on April 21, and therefore syndicated newspapers will soon be publicizing this issue. The Washington Office is working closely with the World Wildlife Fund, EPA, APHIS, and the National Academy of Sciences on the estrogen-mimicking issue and will prepare a Pesticide Advisory Memorandum before the documentary is shown.

CONTACT: DAVE THOMAS (DC)

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NOVO NORDISK ENTOTECH, INC. EXPANDS OPERATIONS IN DAVIS, CA

Novo Nordisk Entotech, Inc., a subsidiary of Novo Nordisk A/S in Denmark announces the expansion of its Davis-based biopesticide Research and Development subsidiary. In addition to its existing R&D operations, Entotech will house some Marketing, Regulatory Affairs, Governmental/External Affairs, and bioinsecticide product Quality Control (QC) functions. Entotech has leased office space in a building adjacent to its current operations in University Research Park in order to accommodate the expansion. "Adding more business-oriented functions, previously located elsewhere in the US, to Entotech makes sense, because of Entotech's proximity to California's important agricultural markets", says Dr. Pam Marrone, Entotech's President. "As a business partner with the Graduate School of Management at UC Davis, we are pleased that we will have access to expert Marketing advice from the GSM."

Novo Nordisk, based in Denmark, is the world's largest supplier of insulin and industrial enzymes and one of the world's largest suppliers of biological pesticides for agriculture, forestry, and public health.

CONTACT: PAM MARRONE (CA)

(916)757-4700

AN INSECTICIDE DELIVERY SYSTEM FOR THE PROTECTION OF CONIFEROUS SEED CROPS IN WILD STANDS

Reforestation of conifer species that are severely affected by pathogens, such as Port-Orford cedar and most white pines, is dependent upon the collection of seeds from certified disease-resistant trees. In California, approximately 500 disease-resistant sugar pines have been identified to serve the needs for reforestation of local sugar pine populations. These certified trees are often extremely tall and are located at high altitudes in remote locations, making them difficult to treat with most insecticide application methods. These trees are the only source of disease-resistant seed for many populations, but cone and seed insects, particularly *Conophthorus ponderosae*, often destroy most of the seeds. Foliar applications of Asana 0.66 EC have been shown to control *C. ponderosae* in small seed orchard trees, but delivery systems for tall trees have not been available until now. As reported earlier in Timely Tips (Issue No. 93-2, August 1993), we conducted preliminary testing of arboreal sprinklers mounted at the tops of tall sugar pine trees with PVC hose running down the boles of the trees to nearly ground level. The system was designed by Diane Herzberg, Missoula Technology & Development Center. Delivery of the tank mix to the crown was accomplished by driving a truck-mounted tank to the trees and pumping the fluid up to the sprinkler for 10-20 minutes, depending on tree size. Sprays using rhodamine dye indicate that we achieved excellent coverage throughout the cone-bearing portion of the crowns, with minimal drift to nontarget areas. Advantages of this system include low cost (\$25/tree for materials), adaptability for frequent applications, durability, and ease of installation. The primary disadvantage is that spraying must be performed when wind speed is low. Once sprinklers are installed, they can be left in place indefinitely. Two European researchers (one from Belgium and one from France) plan to introduce this technique to their tree improvement people. There is a good chance that similar sprinklers will be installed orchard-wide at Lavercantieres, a seed orchard in southwestern France.

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LOW VOLUME TREATMENT OF SINGLE TREES

Do you have equipment and application needs for applying low volumes to single trees? Sometimes we are asked by our clientele - Forest Service, other federal, state, private, and the public how to do single-tree treatments. The practice of hosing trees down with high volumes is becoming outdated. The practice, to name a few negatives, lacks environmental sensitivity, requires high potency chemical insecticides that may no longer be available, and isn't suited for Bt due to high dilution and volumes. If you have equipment and application needs in treating single trees in wild stands, urban settings, or orchards, let us know.

CONTACT: JACK BARRY (CA)

(916)551-1715

CHALLENGING ELM LEAF BEETLE WITH BT

The City of Davis; Novo's Entotech; and University of California (UCD), Department of Agricultural Engineering, and IPM Program are cooperating on ways to improve efficiency of Bt application to control elm leaf beetle. Early instars and adults feed concurrently on the leaves throughout the spring and summer months in the Sacramento Valley. Mortality is feared with multiple-year defoliation. Bill Steinke and Ken Giles (UCD) are evaluating the Curtec citrus orchard spray system to apply Bt to elms that range in height from 40 to 100 feet. The Curtec system consists of multiple spray heads, similar to Beecomists, housed in a hood containing a hydraulic air blast mechanism. The heads can be elevated and directed. The current practice in Davis is to elevate a person on a cherry picker with backpack sprayer. Although the technique is successful it requires about one hour per tree. Given the need for multiple applications this becomes a costly process. WO/FPM Davis is cooperating on monitoring spray drift and documenting field procedures.

CONTACT: JACK BARRY (CA)

(916)551-1715

ECOSYSTEM MANAGEMENT, RESTORATION, AND HERBICIDES

Charlie McMahon, Jim Miller, and Dave Thomas have put together an interesting paper entitled "The Role of Low-Impact Herbicides in Ecosystem Management." Many of you have probably seen Charlie's excellent presentation with slides on this subject. It is interesting to note that many examples of the types of projects that Charlie and his coauthors discuss in their paper are reported as case studies or in abstracts in the journal *Restoration and Management Notes*. This journal is published twice a year by the University of Wisconsin Press for the UW Arboretum (608-262-4952). I personally like the journal because the contents are a combination of hands-in-the-dirt realism interspersed with reflections on the goals and meaning of these restoration efforts. The journal also does an excellent job of abstracting the proceedings of many relevant conferences.

CONTACT: EDWARD MONNIG (MT)

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FSCBG/AGDISP MODEL TECHNOLOGY TRANSFER LETTER

The annual technology transfer letter was sent to the FSCBG/AGDISP model user group on April 25th. These acronyms spelled out are Forest Service-Cramer-Barry-Grim (FSCBG) and AGricultural DISPersal (AGDISP). These models are used to plan and evaluate aerial spray projects. A bibliography of FSCBG/AGDISP reports and publications is available. For a copy of the newsletter, bibliography, or additional information on the models:

CONTACT: JACK BARRY OR PAT SKYLER (CA)

(916)551-1715

WEED PUBLICATIONS AVAILABLE

Weeds of the West. (\$19.50 - includes postage). Order from: University of Wyoming Cooperative Extension Service, Bulletin Room, University of Wyoming, P.O. Box 3313, Laramie, WY 82071-3313.

1993-94 Montana, Utah, and Wyoming Weed Control Handbook. (\$10.00 - includes postage). Order from:

Montana State University - contact your local County Extension Office;
Utah State University - Extension Publications, Logan, UT 84322-5015; or
University of Wyoming Cooperative Extension, Bulletin Room, P.O. Box 3313,
Laramie, WY 82071-3313

Forest Weed Control Manual - a guide to herbicide use in forests. N.A. Davenport, J.W. Ray, A.L. Vanner. FRI Bulletin No. 180, First Edition. (\$35.00 + postage & packaging). Order from: Publications Officer, New Zealand Forest Research Institute, Private Bag 3020, Rotorua, New Zealand 82179.

Weed Science - A Plea for Thought. Robert L. Zimdahl. 1991. (Free). Order from: Department of Plant Pathology and Weed Science, Colorado State University, Ft. Collins, CO 80523.

CONTACT: JACK BARRY (CA)

(916)551-1715

EPA ENDANGERED SPECIES COLORING BOOK

If you attended the National Pesticide Training Course at Marana, you probably picked up one of these neat coloring books for your kids, grandkids, or maybe even one for yourself. Margaret Jones, (EPA, Chicago, ILL) brought a big supply but they disappeared quickly. If you would like a copy of the publication (21T-3048, September 1991) and/or more information about EPA's Endangered Species Protection Program:

CONTACT: ENDANGERED SPECIES PROTECTION PROGRAM (H7506C)
U.S. ENVIRONMENTAL PROTECTION AGENCY
401 M STREET, SW
WASHINGTON, DC 20460

**ACS 1993 FALL NATIONAL MEETING
AGROCHEMICALS DIVISION
DIVISIONAL BOOK SALES PRICE LIST**

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SS522 Pesticides in Urban Environments	\$ 95.00
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SS446 Pesticide Residues and Food Safety: A Harvest of Viewpoints (p)	\$ 35.00
SS442 Immunochemical Methods for Environmental Analysis	\$ 55.00
SS439 Microbes and Microbial Products as Herbicides	\$ 80.00
SS432 Analytical Chemistry of Bacillus Thuringiensis	\$ 35.00
SS426 Enhanced Biodegradation of Pesticides in the Environment	\$ 70.00
Good Laboratory Practice Standards	\$ 90.00

For ordering and discount information:

CONTACT: ANN WILSON (DC)

(202)872-8067

CALL FOR ARTICLES

Please forward to me by the 10th of next month all articles, meeting announcements, publications, reports, or other items of interest that you would like included in the next issue of "Short Subjects and Timely Tips". Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary or abstract that doesn't exceed one page in length. Please include the name, State, and telephone number of the individual who can be contacted for further information.

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DG: P.SKYLER:R05H

CALL FOR ARTICLES

Please forward to me by the 9th of next month all articles, meeting announcements, publications, reports, or other items of interest that you would like included in the next issue of Short Subjects and Timely Tips. Unfortunately I do not have time to summarize or prepare abstracts of reports and articles so please send them in the following format: Brief title and a summary or abstract that doesn't exceed one page in length. Please include the name, State, and telephone number of the individual who can be contacted for further information.

CONTACT: PAT SKYLER (CA)

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PUBLICATIONS AND REPORTS

Ahmed, M.A. and D.B. Smith. 1994. Prediction of hydraulic nozzle deposit patterns. ASAE Paper No. 94-1025. Presented at *ASAE 1994 international summer meeting*. Kansas City, MO, 19-22 June.

Campbell, R.A. and C.A. Howard. 1994. Priorities for forestry insecticide application technology research. *J. Environ. Sci. Health*, B29(4), 591-619.

Craig, I.P.S. and C.S. Parkin. 1992. Herbicide application using a fluid-driven rotary atomizer. *Tropical Pest Management* 38(2):164-166.

Hoffman, W.C. and M. Salyani. 1994. Spray deposition from day and night applications. ASAE Paper No. 94-1026. Presented at *ASAE 1994 international summer meeting*. Kansas City, MO, 19-22 June.

Mierzejewski, K., W. McLane, M. Legendre, B. Tanner, and K. Ducharme. 1993. Study of off-site deposition of malathion using operational procedures for the southeastern cotton boll weevil eradication program. Aerial Application Technology Lab, Pennsylvania State University, State College, PA.

Parkin, C.S., L.O. Brun, and D.M. Suckling. 1992. Spray deposition in relation to endosulfan resistance in coffee berry borer (*Hypothenemus hampei*) (*Coleoptera:Scolytidae*) in New Caledonia. *Crop Protection* Vol. 11:213-220.

Reardon, R., N. Dubois, and W. McLane. 1994. *Bacillus thuringiensis* for managing gypsy moth: A review. FHM-NC-01-94. USDA Forest Service, National Center of Forest Health Management, Morgantown, WV.

Weiner, K.L. and C.S. Parkin. 1993. The use of computational fluid dynamic code for modelling spray from a mistblower. *J. agric. Engng Res.* 55, 313-324.

Womac, A.R. and W.E. Hart. 1994. Atomization of oil and water sprays with air-assisted nozzles. ASAE Paper No. 94-1023. Presented at *ASAE 1994 international summer meeting*. Kansas City, MO, 19-22 June.

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TABLE OF CONTENTS

Topic	Page No.
Pesticides: Risk, Regulation and Research	2
Dave Thomas Reassigned Within Forest Pest Management, Washington Office	2
New IPM at Riverside and Davis	3
USDA Develops Strategy for Implementing IPM on Agricultural Lands	3
Pesticide Reporting	4
Two Summer Interns in the Washington Office	4
2,4-D Label Changes Stress Good Work Practices	4-5
Tick-Borne Diseases in the United States - What's the Difference?	5-6
Spray Drift Task Force	6
Proposed Pesticide Legislation	6-7
California Department of Pesticide Regulation Registers M-Pede for use Against Africanized Bees	8
R5 REIS Gets Favorable Ruling from Ninth Circuit Court of Appeals	8-9
Update on Registration of Borax and Tim-Bor for Annosus Root Disease Control	9-10
Gypsy Moth News	10
Pesticide Usage in the U.S.	10
Pesticide Exposure to Children	10-11
Bugs in Your Computer?	11
Advanced Forest Herbicides Course	11
Integrated Forest Pest Management Course	12
Gypsy Moth in Michigan	12
Call for Articles	12
Publications and Reports	12-13

PESTICIDES: RISK, REGULATION AND RESEARCH

(From *California Agriculture*, Vol. 48, No. 3, May-June 1994)

Frank G. Zalom, Director, Statewide Integrated Pest Management Project, University of California, Davis

"California agriculture, which supplies nearly half of the food brought to American tables, is undergoing an evolution of historic proportions. Complex issues involving water use, farm labor, rural communities, urbanization and agricultural chemicals are challenging California growers and institutions as never before. Changes are being brought about as California's overwhelmingly urban population competes with farmers for common resources, and calls for regulation of agricultural practices that have environmental and health impacts."

"The profound issues challenging California's growers have altered the agricultural mission of UC's Division of Agriculture and Natural Resources. Ensuring an abundant, reliable and reasonably-priced food supply was once a sufficient goal for the University, and the results were evident in the strength of California's agricultural industry. Today, the University must also help growers maintain viable enterprises within a growing array of constraints on what they can do and how they can do it. As a public institution the University must also address the environmental and health concerns of all Californians."

"Proposed methyl bromide alternatives must be evaluated in terms of their efficacy and economics, as well as their own set of risks. More than identifying pest management problems and alternatives, research must provide a scientific foundation for assessing environmental and health risks. Ideally, regulators and scientists would foresee the need for such data, and develop it prior to regulatory decisions. There will always be major disagreements about what constitutes risk. However, growers, consumers, environmentalists, labor, government agencies and the University must work together to identify both acceptable risks and acceptable solutions to economic, environmental and health problems. All groups have a common interest in preserving a viable agricultural system, while protecting the environment and human health."

CONTACT: FRANK G. ZALOM (CA)

(916)752-8350

DAVE THOMAS REASSIGNED WITHIN FOREST PEST MANAGEMENT, WASHINGTON OFFICE

Dave Thomas has been reassigned to the Vegetation Management position within the Pesticide-Use, Management and Coordination Group in the Washington Office. He had previously held the Insecticide position. Dave will continue with many of the duties he was previously completing, such as registration and reregistration, until such time as his position can be filled.

CONTACT: JESUS COTA (DC)

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NEW IPM AT RIVERSIDE AND DAVIS

(From *The Davis Enterprise*, June 19, 1994)

"Rep. Vic Fazio, D-West Sacramento, has secured federal funding to continue the development and construction of integrated pest management facilities in conjunction with the Davis and Riverside campuses of the University of California."

"These research facilities are essential to our agricultural community and to the nation's agricultural economy,' Fazio said. 'This program will move pest research to the next level. California will be taking the lead in finding environmentally safe ways to combat pests as we head into the 21st century.'"

"Currently, there are no facilities in the United States that come close to providing the state-of-the-art facilities and equipment being constructed under the University of California initiative, Fazio said."

"The program will focus on researching such pests as the white fly and Africanized bee."

"The facilities will be constructed in two phases. Phase I of the project will be an 18,000-square-foot laboratory at UC Riverside to accelerate research leading to the development of biological and other natural pest controls."

"Phase II will construct a 39,000-square-foot facility on the UCD campus to support research in environmentally compatible pest management strategies, parasitoids, bioengineering and genetically altered organisms."

CONTACT: JACK BARRY (CA)

(916)551-1715

USDA DEVELOPS STRATEGY FOR IMPLEMENTING IPM ON AGRICULTURAL LANDS

Recently the Pesticide-Use, Management and Coordination Group worked with the Assistant Secretary's office to develop a USDA strategy to implement the current administration's desire to have Integrated Pest Management (IPM) implemented on 75% of all agricultural lands by the year 2000. Although forestry is not the focus of the strategy, it is included. The Forest Service has essentially already achieved the administration's goal on National Forest System lands.

CONTACT: DAVE THOMAS (DC)

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PESTICIDE REPORTING

Recently, Dave Thomas, WO/FPM, met with Dave Roschke of the Methods Application Group (MAG) in Ft. Collins, CO, and Jim Bunch, a contractor assisting MAG, to finalize the 1994 Annual Pesticide-Use Report. The reporting system is being redesigned to provide more meaningful and useful information at all organizational levels within the Forest Service. Initially the reporting system was developed to accomplish the Annual Report of the Forest Service in which there is a legal requirement to provide the Annual Pesticide-Use Report. A "draft" of the 1994 instructions is being prepared and will be distributed to all of the pesticide coordinators soon.

CONTACT: DAVE THOMAS (DC)

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TWO SUMMER INTERNS IN THE WASHINGTON OFFICE

The Washington Office, Forest Pest Management, has two students from Puerto Rico working as summer interns - Joan Gutierrez, who holds a bachelor's degree in animal sciences from Purdue University, and Lillian Diaz Castillo, a senior majoring in communications at the University of Puerto Rico. Both plan to attend graduate school in the near future. With this internship they plan to gain work experience in their fields of study as well as insight in how the federal government operates. Joan is working with the Pesticide-Use, Management and Coordination Group and Lillian is working with the Forest Health Group.

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2,4-D LABEL CHANGES STRESS GOOD WORK PRACTICES

(From *Utah Pesticide and Toxic News*, Vol. 12, No. 6, June 1994, Cooperative Extension Service, Utah State University, Logan, UT)

"In order to keep the herbicide 2,4-D available to those who rely on it for agriculture, forestry, turf care and roadside and rights-of-way maintenance, the Industry Task Force II on 2,4-D Research Data has reached an agreement with the U.S. Environmental Protection Agency (EPA) to undertake an exposure reduction program while completing overdue scientific studies required by the Agency. The Task Force is comprised of the registrants of technical grade 2,4-D (which appears on product ingredients as some form of 2,4-dichlorophenoxyacetic acid) which manufacture or sell 2,4-D products in the United States: AGRO-GOR, DowElanco, Nufarm USA and Phone-Poulenc."

"The EPA is convening a panel of experts to comprehensively evaluate all pertinent 2,4-D studies including studies involving long-term exposure. Pending the completion of the evaluation and the evaluation of reregistration studies being performed by 2,4-D registrants, the new practices and requirements described in this program will appear on new 2,4-D product labels. In addition to label changes, a national applicator/user exposure reduction program will be implemented."

"Compliance with these exposure reduction measures prescribed on the new labels on products containing 2,4-D is required by law. It also represents common sense and good work practices appropriate to the application of all pesticides. All 2,4-D applications will be affected by the new label requirements, including agriculture, forestry, aquatics, utility rights-of-way and roadside maintenance, golf course and other turf management, as well as commercial and homeowner lawn care."

"Because the greatest potential for exposure to pesticides like 2,4-D occurs during mixing and application, the following measures are designed to reduce pesticide exposure by requiring protective clothing and equipment, and proper hygiene, as well as restricting the amount and frequency of application and access to treated areas. While the registrants of 2,4-D remain firm in their support of 2,4-D, they advocate handling pesticide products with care and respect. Starting in October of last year, new directions specifying good work practices in the use of 2,4-D began appearing on product labels, as a result of an agreement reached between EPA and member companies of the 2,4-D Task Force. While different requirements have been set for different users and formulators, the changes generally outline protective clothing, hygiene needs and use practices intended to minimize exposure."

"In part, they anticipate new pesticide precautions presently being implemented under the federal EPA Worker Protection Standard. In addition, by agreeing to the label changes the Task Force was given more time by EPA to complete the remaining studies which the Agency requires in order to evaluate the product for reregistration. Presently, reregistration requirements for 2,4-D include about 230 studies, 120 of which the Task Force has already submitted to EPA, with the remainder now being completed by 34 different consultants, contractors or laboratories. Cost of these studies to Task Force member companies has been projected at \$17 to \$20 million. In addition, more than 100 separate studies are also underway through individual Task Force members to gather data on specialized or proprietary amine or ester formulations which are not being supported by the Task Force itself. (2,4-D, 4/94)"

CONTACT: HOWARD DEER (UT)

(801)797-1600

TICK-BORNE DISEASES IN THE UNITED STATES - WHAT'S THE DIFFERENCE?

(From *FOCUS on Lyme Disease*, Issue No. 3, Summer 1994, United States Army Environmental Hygiene Agency)

"In the United States, more vector-borne diseases are transmitted by ticks than by any other arthropod. Ticks can carry many different pathogens, including bacteria, rickettsia, viruses, and protozoa. Although Lyme disease accounts for the majority of cases of tick-borne disease, there are several other important illnesses that can result from the bite of a tick. Preliminary diagnosis may be difficult, as early symptoms of many of them are similar."

Table 1. Major tick-borne diseases of the United States

DISEASE	PATHOGEN	CLASSIFICATION	TICK VECTOR (GENUS -
Lyme Disease	<i>Borrelia burgdorferi</i>	Bacteria(spirochete)	Ixodes
Relapsing fever	<i>Borrelia spp.</i>	Bacteria(spirochete)	Ornithodoros
Tularemia	<i>Francisella tularensis</i>	Bacteria (coccus)	Amblyomma? Dermacentor?
Rocky Mountain spotted fever	<i>Rickettsia rickettsii</i>	Rickettsia	Dermacentor
Ehrlichiosis	<i>Ehrlichia chaffeensis</i>	Rickettsia	Amblyomma? Dermacentor?
Babesiosis	<i>Babesia spp.</i>	Protozoa	Ixodes
Colorado tick fever	<i>coltivirus spp.</i>	Virus	Dermacentor
Tick paralysis	Toxin	Neurotoxin	Amblyomma, Dermacentor

SPRAY DRIFT TASK FORCE

The EPA requires all agriculture chemical companies to provide information on pesticide spray drift for their commercial pesticide end-use products. The spring/summer edition of "Down to Earth" (published by DowElanco) contains a story on the formation of an industry consortium to address these issues. This multi-company effort has led to the formation of a Spray Drift Task Force that is pooling resources and scientific expertise to develop a generic data base on spray drift. The article also discusses modeling efforts including the use of the Forest Service's FSCBG/AGDISP models.

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PROPOSED PESTICIDE LEGISLATION

A number of bills have been recently introduced into the United States Congress. All of them are pending and are in various stages of legislative development. The Clinton Administration has also submitted a legislative agenda for pesticide regulation but it has not gone anywhere. Below is a list of the Bills that could affect pesticide use in the Forest Service and that we are aware of:



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Table 1. Major life history stages of the cotton bollworm

Stage	Approximate duration (days)	Approximate temperature range (°C)	Approximate feeding behavior
Egg	1-2	25-30	None
1st instar	2-3	25-30	Feeds on leaves
2nd instar	3-4	25-30	Feeds on leaves
3rd instar	4-5	25-30	Feeds on leaves
4th instar	5-6	25-30	Feeds on leaves
5th instar	6-7	25-30	Feeds on leaves
6th instar	7-8	25-30	Feeds on leaves
7th instar	8-9	25-30	Feeds on leaves
8th instar	9-10	25-30	Feeds on leaves
9th instar	10-11	25-30	Feeds on leaves
10th instar	11-12	25-30	Feeds on leaves
11th instar	12-13	25-30	Feeds on leaves
12th instar	13-14	25-30	Feeds on leaves
13th instar	14-15	25-30	Feeds on leaves
14th instar	15-16	25-30	Feeds on leaves
15th instar	16-17	25-30	Feeds on leaves
16th instar	17-18	25-30	Feeds on leaves
17th instar	18-19	25-30	Feeds on leaves
18th instar	19-20	25-30	Feeds on leaves
19th instar	20-21	25-30	Feeds on leaves
20th instar	21-22	25-30	Feeds on leaves
21st instar	22-23	25-30	Feeds on leaves
22nd instar	23-24	25-30	Feeds on leaves
23rd instar	24-25	25-30	Feeds on leaves
24th instar	25-26	25-30	Feeds on leaves
25th instar	26-27	25-30	Feeds on leaves
26th instar	27-28	25-30	Feeds on leaves
27th instar	28-29	25-30	Feeds on leaves
28th instar	29-30	25-30	Feeds on leaves
29th instar	30-31	25-30	Feeds on leaves
30th instar	31-32	25-30	Feeds on leaves
31st instar	32-33	25-30	Feeds on leaves
32nd instar	33-34	25-30	Feeds on leaves
33rd instar	34-35	25-30	Feeds on leaves
34th instar	35-36	25-30	Feeds on leaves
35th instar	36-37	25-30	Feeds on leaves
36th instar	37-38	25-30	Feeds on leaves
37th instar	38-39	25-30	Feeds on leaves
38th instar	39-40	25-30	Feeds on leaves
39th instar	40-41	25-30	Feeds on leaves
40th instar	41-42	25-30	Feeds on leaves
41st instar	42-43	25-30	Feeds on leaves
42nd instar	43-44	25-30	Feeds on leaves
43rd instar	44-45	25-30	Feeds on leaves
44th instar	45-46	25-30	Feeds on leaves
45th instar	46-47	25-30	Feeds on leaves
46th instar	47-48	25-30	Feeds on leaves
47th instar	48-49	25-30	Feeds on leaves
48th instar	49-50	25-30	Feeds on leaves
49th instar	50-51	25-30	Feeds on leaves
50th instar	51-52	25-30	Feeds on leaves
51st instar	52-53	25-30	Feeds on leaves
52nd instar	53-54	25-30	Feeds on leaves
53rd instar	54-55	25-30	Feeds on leaves
54th instar	55-56	25-30	Feeds on leaves
55th instar	56-57	25-30	Feeds on leaves
56th instar	57-58	25-30	Feeds on leaves
57th instar	58-59	25-30	Feeds on leaves
58th instar	59-60	25-30	Feeds on leaves
59th instar	60-61	25-30	Feeds on leaves
60th instar	61-62	25-30	Feeds on leaves
61st instar	62-63	25-30	Feeds on leaves
62nd instar	63-64	25-30	Feeds on leaves
63rd instar	64-65	25-30	Feeds on leaves
64th instar	65-66	25-30	Feeds on leaves
65th instar	66-67	25-30	Feeds on leaves
66th instar	67-68	25-30	Feeds on leaves
67th instar	68-69	25-30	Feeds on leaves
68th instar	69-70	25-30	Feeds on leaves
69th instar	70-71	25-30	Feeds on leaves
70th instar	71-72	25-30	Feeds on leaves
71st instar	72-73	25-30	Feeds on leaves
72nd instar	73-74	25-30	Feeds on leaves
73rd instar	74-75	25-30	Feeds on leaves
74th instar	75-76	25-30	Feeds on leaves
75th instar	76-77	25-30	Feeds on leaves
76th instar	77-78	25-30	Feeds on leaves
77th instar	78-79	25-30	Feeds on leaves
78th instar	79-80	25-30	Feeds on leaves
79th instar	80-81	25-30	Feeds on leaves
80th instar	81-82	25-30	Feeds on leaves
81st instar	82-83	25-30	Feeds on leaves
82nd instar	83-84	25-30	Feeds on leaves
83rd instar	84-85	25-30	Feeds on leaves
84th instar	85-86	25-30	Feeds on leaves
85th instar	86-87	25-30	Feeds on leaves
86th instar	87-88	25-30	Feeds on leaves
87th instar	88-89	25-30	Feeds on leaves
88th instar	89-90	25-30	Feeds on leaves
89th instar	90-91	25-30	Feeds on leaves
90th instar	91-92	25-30	Feeds on leaves
91st instar	92-93	25-30	Feeds on leaves
92nd instar	93-94	25-30	Feeds on leaves
93rd instar	94-95	25-30	Feeds on leaves
94th instar	95-96	25-30	Feeds on leaves
95th instar	96-97	25-30	Feeds on leaves
96th instar	97-98	25-30	Feeds on leaves
97th instar	98-99	25-30	Feeds on leaves
98th instar	99-100	25-30	Feeds on leaves
99th instar	100-101	25-30	Feeds on leaves
100th instar	101-102	25-30	Feeds on leaves
101st instar	102-103	25-30	Feeds on leaves
102nd instar	103-104	25-30	Feeds on leaves
103rd instar	104-105	25-30	Feeds on leaves
104th instar	105-106	25-30	Feeds on leaves
105th instar	106-107	25-30	Feeds on leaves
106th instar	107-108	25-30	Feeds on leaves
107th instar	108-109	25-30	Feeds on leaves
108th instar	109-110	25-30	Feeds on leaves
109th instar	110-111	25-30	Feeds on leaves
110th instar	111-112	25-30	Feeds on leaves
111th instar	112-113	25-30	Feeds on leaves
112th instar	113-114	25-30	Feeds on leaves
113th instar	114-115	25-30	Feeds on leaves
114th instar	115-116	25-30	Feeds on leaves
115th instar	116-117	25-30	Feeds on leaves
116th instar	117-118	25-30	Feeds on leaves
117th instar	118-119	25-30	Feeds on leaves
118th instar	119-120	25-30	Feeds on leaves
119th instar	120-121	25-30	Feeds on leaves
120th instar	121-122	25-30	Feeds on leaves
121st instar	122-123	25-30	Feeds on leaves
122nd instar	123-124	25-30	Feeds on leaves
123rd instar	124-125	25-30	Feeds on leaves
124th instar	125-126	25-30	Feeds on leaves
125th instar	126-127	25-30	Feeds on leaves
126th instar	127-128	25-30	Feeds on leaves
127th instar	128-129	25-30	Feeds on leaves
128th instar	129-130	25-30	Feeds on leaves
129th instar	130-131	25-30	Feeds on leaves
130th instar	131-132	25-30	Feeds on leaves
131st instar	132-133	25-30	Feeds on leaves
132nd instar	133-134	25-30	Feeds on leaves
133rd instar	134-135	25-30	Feeds on leaves
134th instar	135-136	25-30	Feeds on leaves
135th instar	136-137	25-30	Feeds on leaves
136th instar	137-138	25-30	Feeds on leaves
137th instar	138-139	25-30	Feeds on leaves
138th instar	139-140	25-30	Feeds on leaves
139th instar	140-141	25-30	Feeds on leaves
140th instar	141-142	25-30	Feeds on leaves
141st instar	142-143	25-30	Feeds on leaves
142nd instar	143-144	25-30	Feeds on leaves
143rd instar	144-145	25-30	Feeds on leaves
144th instar	145-146	25-30	Feeds on leaves
145th instar	146-147	25-30	Feeds on leaves
146th instar	147-148	25-30	Feeds on leaves
147th instar	148-149	25-30	Feeds on leaves
148th instar	149-150	25-30	Feeds on leaves
149th instar	150-151	25-30	Feeds on leaves
150th instar	151-152	25-30	Feeds on leaves
151st instar	152-153	25-30	Feeds on leaves
152nd instar	153-154	25-30	Feeds on leaves
153rd instar	154-155	25-30	Feeds on leaves
154th instar	155-156	25-30	Feeds on leaves
155th instar	156-157	25-30	Feeds on leaves
156th instar	157-158	25-30	Feeds on leaves
157th instar	158-159	25-30	Feeds on leaves
158th instar	159-160	25-30	Feeds on leaves
159th instar	160-161	25-30	Feeds on leaves
160th instar	161-162	25-30	Feeds on leaves
161st instar	162-163	25-30	Feeds on leaves
162nd instar	163-164	25-30	Feeds on leaves
163rd instar	164-165	25-30	Feeds on leaves
164th instar	165-166	25-30	Feeds on leaves
165th instar	166-167	25-30	Feeds on leaves
166th instar	167-168	25-30	Feeds on leaves
167th instar	168-169	25-30	Feeds on leaves
168th instar	169-170	25-30	Feeds on leaves
169th instar	170-171	25-30	Feeds on leaves
170th instar	171-172	25-30	Feeds on leaves
171st instar	172-173	25-30	Feeds on leaves
172nd instar	173-174	25-30	Feeds on leaves
173rd instar	174-175	25-30	Feeds on leaves
174th instar	175-176	25-30	Feeds on leaves
175th instar	176-177	25-30	Feeds on leaves
176th instar	177-178	25-30	Feeds on leaves
177th instar	178-179	25-30	Feeds on leaves
178th instar	179-180	25-30	Feeds on leaves
179th instar	180-181	25-30	Feeds on leaves
180th instar	181-182	25-30	Feeds on leaves
181st instar	182-183	25-30	Feeds on leaves
182nd instar	183-184	25-30	Feeds on leaves
183rd instar	184-185	25-30	Feeds on leaves
184th instar	185-186	25-30	Feeds on leaves
185th instar	186-187	25-30	Feeds on leaves
186th instar	187-188	25-30	Feeds on leaves
187th instar	188-189	25-30	Feeds on leaves
188th instar	189-190	25-30	Feeds on leaves
189th instar	190-191	25-30	Feeds on leaves
190th instar	191-192	25-30	Feeds on leaves
191st instar	192-193	25-30	Feeds on leaves
192nd instar	193-194	25-30	Feeds on leaves
193rd instar	194-195	25-30	Feeds on leaves
194th instar	195-196	25-30	Feeds on leaves
195th instar	196-197	25-30	Feeds on leaves
196th instar	197-198	25-30	Feeds on leaves
197th instar	198-199	25-30	Feeds on leaves
198th instar	199-200	25-30	Feeds on leaves
199th instar	200-201	25-30	Feeds on leaves
200th instar	201-202	25-30	Feeds on leaves
201st instar	202-203	25-30	Feeds on leaves
202nd instar	203-204	25-30	Feeds on leaves
203rd instar	204-205	25-30	Feeds on leaves
204th instar	205-206	25-30	Feeds on leaves
205th instar	206-207	25-30	Feeds on leaves
206th instar	207-208	25-30	Feeds on leaves
207th instar	208-209	25-30	Feeds on leaves
208th instar	209-210	25-30	Feeds on leaves
209th instar	210-211	25-30	Feeds on leaves
210th instar	211-212	25-30	Feeds on leaves
211st instar	212-213	25-30	Feeds on leaves
212nd instar	213-214	25-30	Feeds on leaves
213rd instar	214-215	25-30	Feeds on leaves
214th instar	215-216	25-30	Feeds on leaves
215th instar	216-217	25-30	Feeds on leaves
216th instar	217-218	25-30	Feeds on leaves
217th instar	218-219	25-30	Feeds on leaves
218th instar	219-220	25-30	Feeds on leaves
219th instar	220-221	25-30	Feeds on leaves
220th instar	221-222	25-30	Feeds on leaves
221st instar	222-223	25-30	Feeds on leaves
222nd instar	223-224	25-30	Feeds on leaves
223rd instar	224-225	25-30	Feeds on leaves
224th instar	225-226	25-30	Feeds on leaves
225th instar	226-227	25-30	Feeds on leaves
226th instar	227-228	25-30	Feeds on leaves
227th instar	228-229	25-30	Feeds on leaves
228th instar	229-230	25-30	Feeds on leaves
229th instar	230-231	25-30	Feeds on leaves
230th instar	231-232	25-30	Feeds on leaves
231st instar	232-233	25-30	Feeds on leaves
232nd instar	233-234	25-30	Feeds on leaves
233rd instar	234-235	25-30	Feeds on leaves
234th instar	235-236	25-30	Feeds on leaves
235th instar	236-237	25-30	Feeds on leaves
236th instar	237-238	25-30	Feeds on leaves
237th instar	238-239	25-30	Feeds on leaves
238th instar	239-240	25-30	Feeds on leaves
239th instar	240-241	25-30	Feeds on leaves
240th instar	241-242	25-30	Feeds on leaves
241st instar	242-243	25-30	Feeds on leaves
242nd instar	243-244	25-30	Feeds on leaves
243rd instar	244-245	25-30	Feeds on leaves
244th instar	245-246	25-30	Feeds on leaves
245th instar	246-247	25-30	Feeds on leaves
246th instar	247-248	25-30	Feeds on leaves
247th instar	248-249	25-30	Feeds on leaves
248th instar	249-250	25-30	Feeds on leaves
249th instar	250-251	25-30	Feeds on leaves
250th instar	251-252	25-30	Feeds on leaves
251st instar	252-253	25-30	Feeds on leaves
252nd instar	253-254	25-30	Feeds on leaves
253rd instar	254-255	25-30	Feeds on leaves
254th instar	255-256	25-30	Feeds on leaves
255th instar	256-257	25-30	Feeds on leaves
256th instar	257-258	25-30	Feeds on leaves
257th instar	258-259	25-30	Feeds on leaves
258th instar	259-260	25-30	Feeds on leaves
259th instar	260-261		